

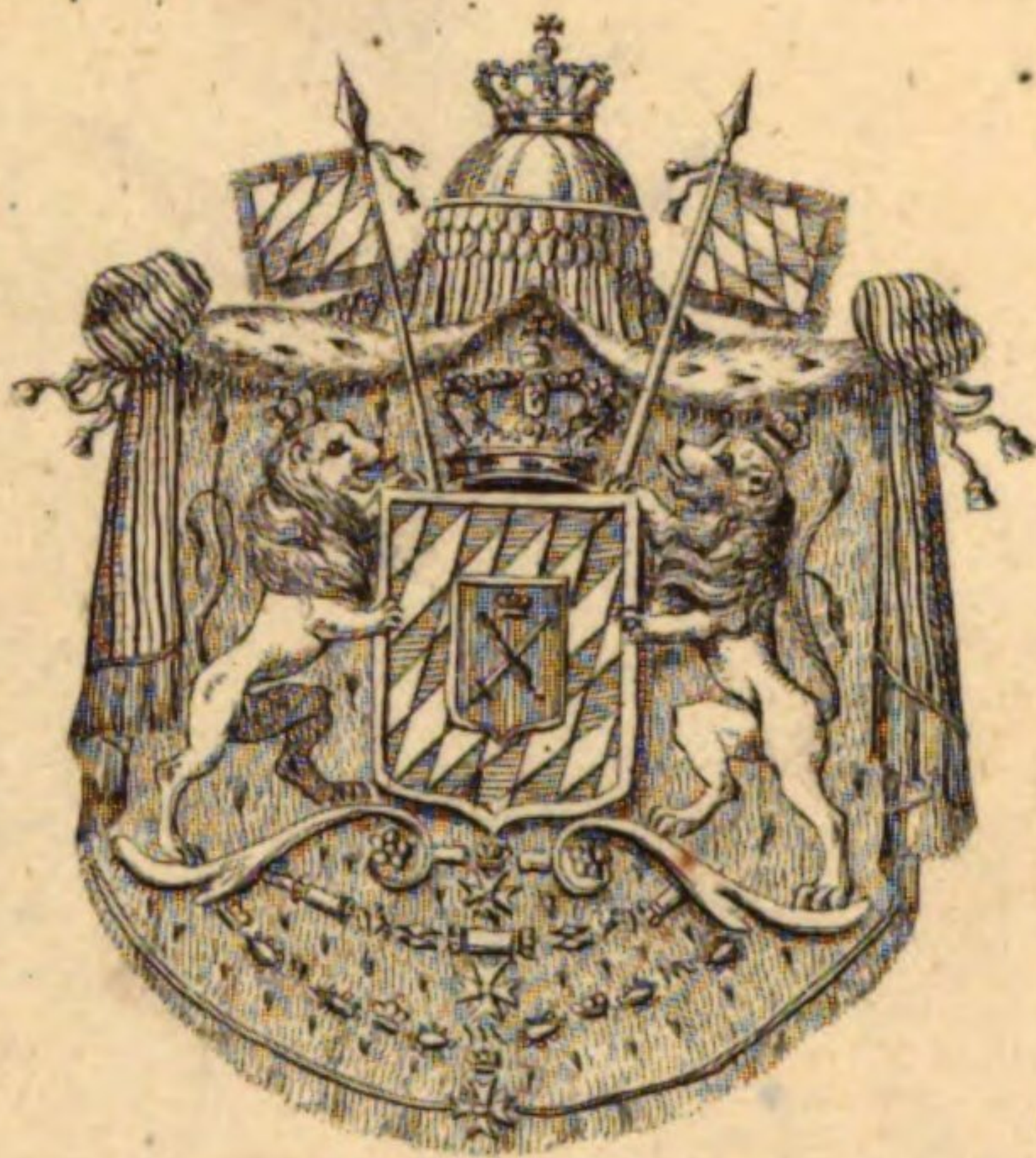
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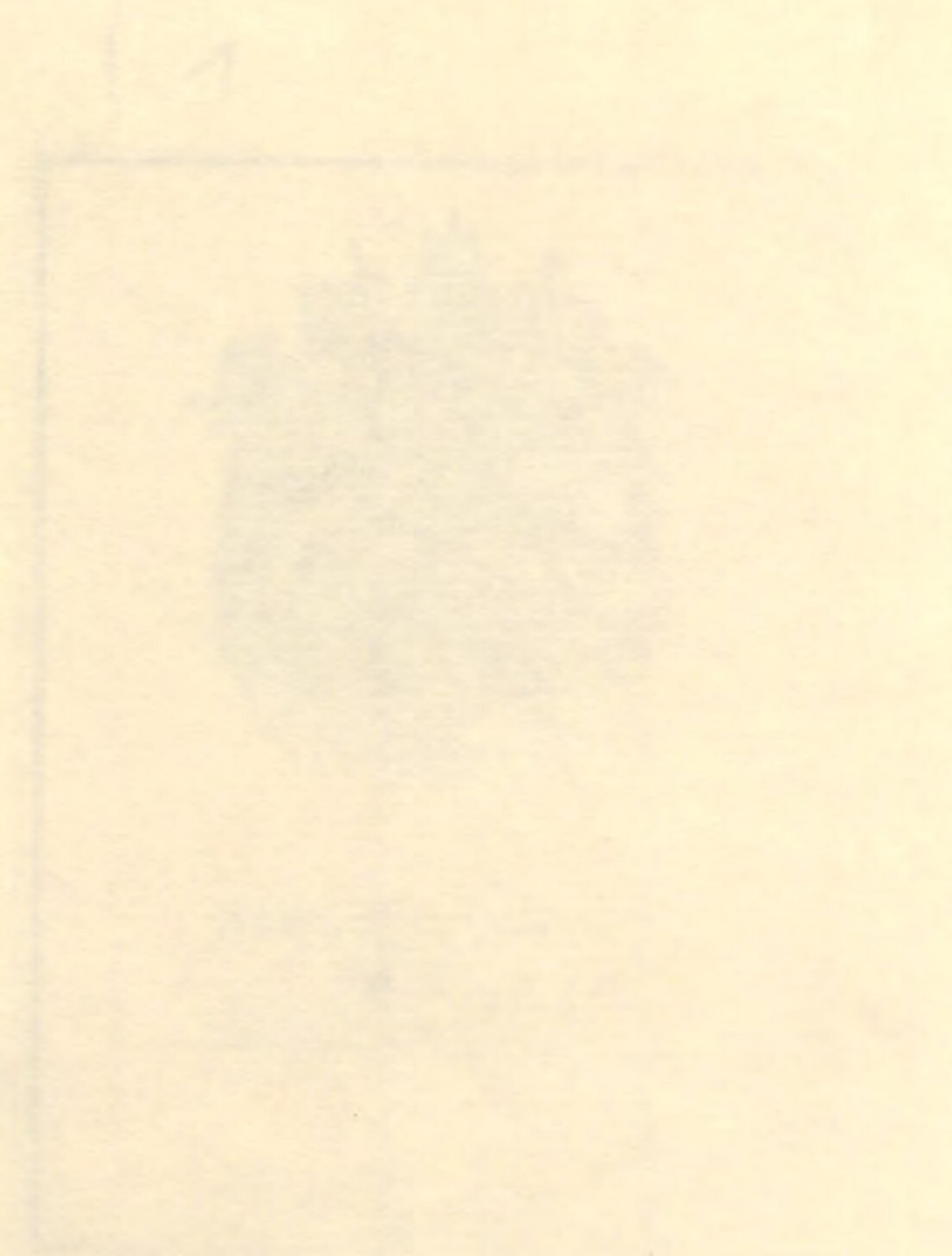
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AMERICAN
MEDICAL BOTANY
A COLLECTION
OF THE
LIVING MEDICINAL PLANTS
OF THE
UNITED STATES
WITH
BOTANICAL HISTORY AND CHEMICAL ANALYSIS
AND
MEDICINE, PART AND THE ARTS
WITH
COLOURED ENGRAVINGS
BY JACOB RICELOW, M.D.
LECTURED PROFESSOR AND ATTENDANT OF MEDICAL MEDICINE AND BOTANY
IN HARVARD UNIVERSITY
VOL. I.
BOSTON
PUBLISHED BY LITTLE, BROWN AND HIGLAND, AT THE
NO. 22 CORNHILL
1817

**AMERICAN
MEDICAL BOTANY,**

BEING A COLLECTION

OF THE

NATIVE MEDICINAL PLANTS

OF THE

UNITED STATES,

CONTAINING THEIR

BOTANICAL HISTORY AND CHEMICAL ANALYSIS,

AND PROPERTIES AND USES

IN

MEDICINE, DIET AND THE ARTS,

WITH

COLOURED ENGRAVINGS.

==
BY JACOB BIGELOW, M. D.

RUMFORD PROFESSOR AND LECTURER ON MATERIA MEDICA AND BOTANY
IN HARVARD UNIVERSITY.

==
VOL. I.

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• BOSTON:

**PUBLISHED BY CUMMINGS AND HILLIARD, AT THE
BOSTON BOOKSTORE, NO. 1, CORNHILL.**

UNIVERSITY PRESS...HILLIARD AND METCALF.

1817.

M. med. 121^m
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District of Massachusetts, to wit:

District Clerk's office.

Be it remembered, that on the eighteenth day of October, A. D. 1817, and in the forty second year of the independence of the United States of America, Jacob Bigelow, M. D. of the said district, has deposited in this office the title of a book, the right whereof he claims as author, in the words following, viz.

"American Medical Botany, being a collection of the native medicinal plants of the United States, containing their botanical history and chemical analysis, and properties and uses in medicine, diet and the arts, with coloured engravings. By JACOB BIGELOW, M. D. Rumford Professor and Lecturer on Materia Medica and Botany in Harvard University. Vol. I."

In conformity to the act of the congress of the United States, entitled "An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies during the times therein mentioned;" and also to an act, entitled, "An act supplementary to an act, entitled, An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

JNO. W. DAVIS, Clerk of the district of Massachusetts.

TO THE
REV. JOHN THORNTON KIRKLAND,
D. D. LL. D.

PRESIDENT OF HARVARD UNIVERSITY IN CAMBRIDGE,
MASSACHUSETTS.

DEAR SIR,

THE present flourishing state of the Institution, over which you preside, cannot be ascribed to any more efficient cause, than to the zeal and ability, with which you have watched over its interests.

Those, who in any measure derive from this Institution their opportunities of being useful, may with justice direct their first acknowledgments to you.

Being confident, that no attempt for the promotion of useful knowledge will be regarded by you with indifference, I am happy in offering to you, in the present volume, a testimony of my respect and esteem.

J. B.

Boston, October, 1817.

TO THE
REV. JOHN THORNTON RICKLAND
PRESIDENT

It is long meditated the commencement
of a work on the medicinal vegetables of the
United States, and feeling myself obligated for its
completion, by the instructions from the
honorable body which I have the honor to hold a professor-
ship: it may be proper to make at the outset some
general statements of the motives and objects of
such a publication.

The *Medical* comprising the great
body of medicinal agents now in use in the hands
of physicians, cannot be said to need an increase
in the number of its articles. It is already in-
creased with many superfluous drugs; even its
other substances are more numerous than can be
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Under these circumstances, the introduction of
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PREFACE.

HAVING long meditated the commencement of a work on the medicinal vegetables of the United States, and feeling myself obligated for its completion, by the instructions from the University in which I have the honor to hold a professorship ; it may be proper to make at the outset some general statements of the motives and objects of such a publication.

The Materia Medica, comprising the great body of medicinal agents now in use in the hands of physicians, cannot be said to need an increase in the number of its articles. It is already incumbered with many superfluous drugs ; even its active substances are more numerous than can be of use to any one physician, so that it seems quite as susceptible of benefit from reduction as from augmentation in the number of its materials. Under these circumstances, the introduction of new medicines can only be authorized, where

from the peculiarity of their powers, or the facility of their acquisition, they are calculated to take the place of others previously in use.

Of our present stock of medicinal agents, collected from various parts of the globe, a few appear to be *unique* in their powers, and could not in the present state of our knowledge, be superseded by other substances. A number more possess active properties, yet of a kind, for which substitutes might be found among the native productions of almost every country into which they are imported. There are others which possess little activity or value, but which, from a sort of fashion, are still articles of commerce and consumption.

In the management of diseases, the physician requires instruments of determinate power, on the operation of which, he may build definite expectations. Many such are already in his hands. Yet when we consider how small a portion of the vegetable kingdom has been *medically* examined, there can be little doubt that a vast number of active substances, many perhaps of specific efficacy, remain for future inquirers to discover. In this respect, every successive age is making acquisitions. But a century or two ago, the civilized world were unacquainted with the properties of ipecacuanha, of jalap, and the Peruvian

bark. The powers of digitalis in certain diseases are of very recent observation. At the present day, we are speculating on the probable composition of a vegetable medicine, which cures the gout.

Medicinal substances frequently owe their first introduction to accident. Many have been at first brought up as antidotes for the poison of serpents, as remedies for syphilis, or as specifics against imaginary diseases. Previously to this, they were neglected as useless, or avoided as dangerous. It is a subject of some curiosity to consider, if the knowledge of the present *Materia Medica* were by any means to be lost, how many of the same articles would again rise into notice and use. Doubtless a variety of new substances would develop unexpected powers, while perhaps the poppy would be shunned as a deleterious plant, and the cinchona might grow unmolested upon the mountains of Quito.

It is the policy of every country to convert as far as possible its own productions to use, as a mean of multiplying its resources, and diminishing its tribute to foreigners. The plants of the United States are various in their character in proportion to the extent of latitudes and climates, which our country embraces. Among those which

have been medicinally investigated, are many of useful properties and decided efficacy. Several departments of the *Materia Medica* may be amply supplied from our own forests and meadows, although there are others, for which we must as yet depend on foreign countries. We have yet to discover our anodynes and our emetics, although we abound in bitters, astringents, aromatics and demulcents. In the present state of our knowledge we could not well dispense with opium and ipicacuanha, yet a great number of foreign drugs, such as gentian, columbo, chamomile, kino, catechu, cascarilla, canella, &c. for which we pay a large annual tax to other countries, might in all probability be superceded by the indigenous products of our own. It is certainly better that our own country people should have the benefit of collecting such articles, than that we should pay for them to the Moors of Africa, or the Indians of Brazil.

Independent of the frauds of adulteration, which may be practised by savages upon drugs, whose origin is hardly known to Europeans, the embarrassments occasioned by the chances of war and commercial restrictions, form serious objections to an exclusive dependence on foreign medicines. It is but a few years since some circum-

stances of this sort occasioned a sudden and enormous rise in the price of opium, and a general inquiry, what could be substituted for opium when the usual supplies should have failed.

In a work like the present, although we cannot hope to supply all the desiderata of an indigenous *Materia Medica*; yet it will be satisfactory to have done something towards an investigation of the real properties of our most interesting plants, and to have facilitated a knowledge of them in those, to whom they may be useful. In a pursuit of this kind, the botanist has views even beyond the physician. To him it is important not only to know what plants have properties, that are eminently useful, but also to know, what are the properties and uses of all the plants which surround him. In proportion as inquiries of this sort are pursued, the natural resources of a country become developed, and its natural disadvantages compensated. We are told that in China every plant is applied to some valuable purpose, and there is scarcely a weed that has not its determinate use.* A learned author† observes, that “no writer whatever has rendered the natural productions of the happiest and most luxuriant climate of the globe, half so interesting or instruc-

* Macartney's Embassy, vol. ii. chap. 11.

† Sir J. E. Smith.

tive, as Linnæus has made those of his own northern country."

Under the title of **AMERICAN MEDICAL BOTANY**, it is my intention to offer to the public a series of coloured engravings of those native plants, which possess properties deserving the attention of medical practitioners. The plan will likewise include vegetables of particular utility in diet and the arts ; also poisonous plants which must be known, that they may be avoided. In making the selection, I have endeavoured to be guided by positive evidence of important qualities, and not by the insufficient testimony of popular report. In treating of each plant, its botanical history will be given ; the result of such chemical examinations as I have been able to make of its constituent parts, and lastly its medical history. The botanical account will be found more diffuse than is necessary for exclusive botanists. The chemical inquiries are made chiefly with a view to the pharmaceutical preparations of each plant, or to interesting principles it may contain. Its medical history will contain such facts, relative to its operation on the human system, as are known to me from my own observation, or the evidence of those, who are qualified to form correct opinions on the subject.

I am by no means ambitious to excite an interest in the subjects of this work, by exaggerated accounts of virtues which do not belong to them. Much harm has been in medicine, by the partial representations of those, who, having a point to prove, have suppressed their unsuccessful experiments, and brought into view none but favorable facts. If, from a desire of avoiding error, I have not always been able to establish fully the character of a native vegetable, it will be recollected that many foreign drugs, which have been for centuries in use, have still an unsettled reputation as to their powers and modes of operating.

The figures of the present volume have been engraved and coloured from original drawings, made principally by myself. Dissections of the flower and fruit have been added to each for the use of botanical students. The subsequent portions of the work will be issued as rapidly as is consistent with their faithful execution.

At the end will be added an appendix or supplement, containing such facts relative to the plants already published, as may have come to light since their publication.

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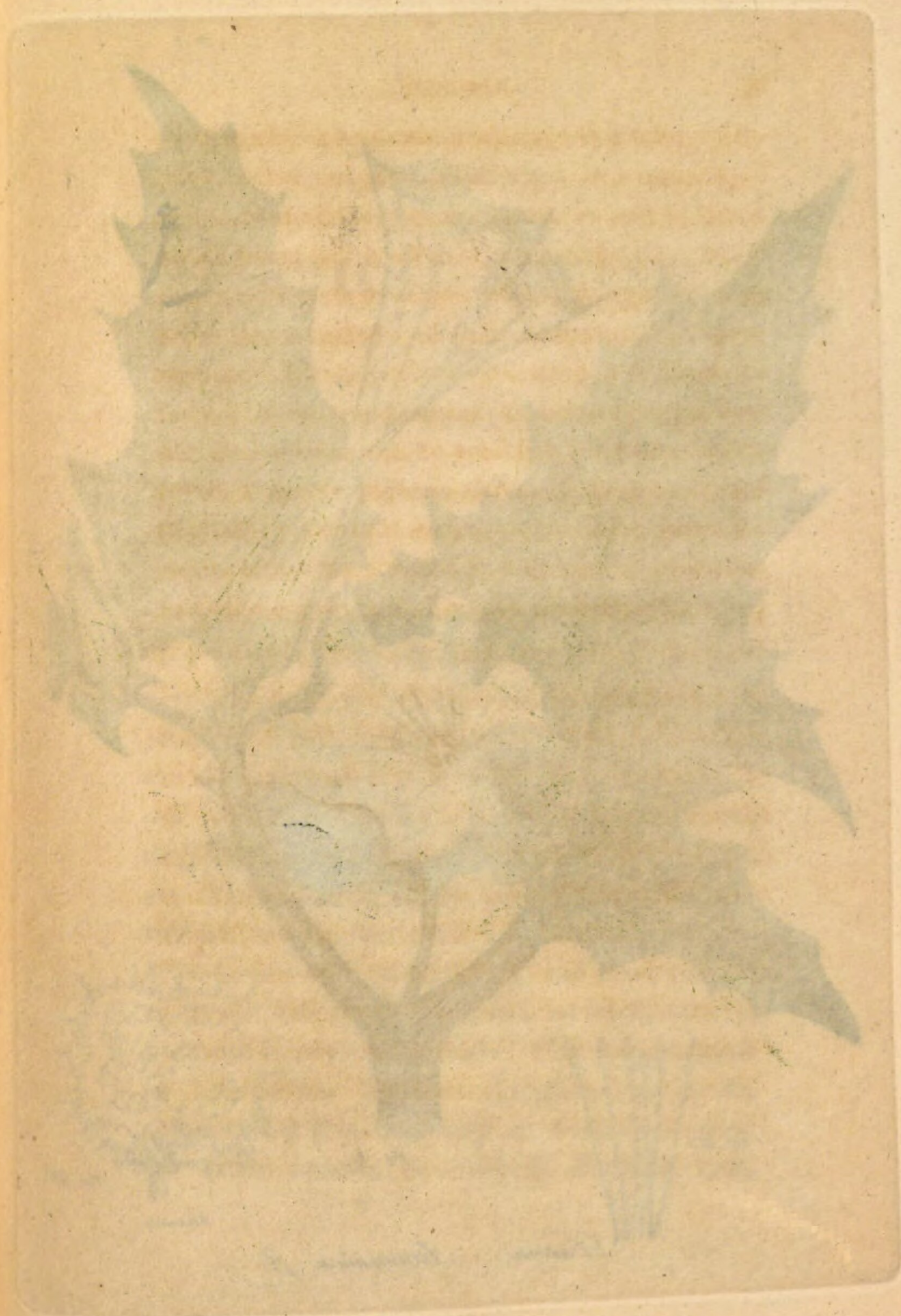




Fig. II.



Fig. I.

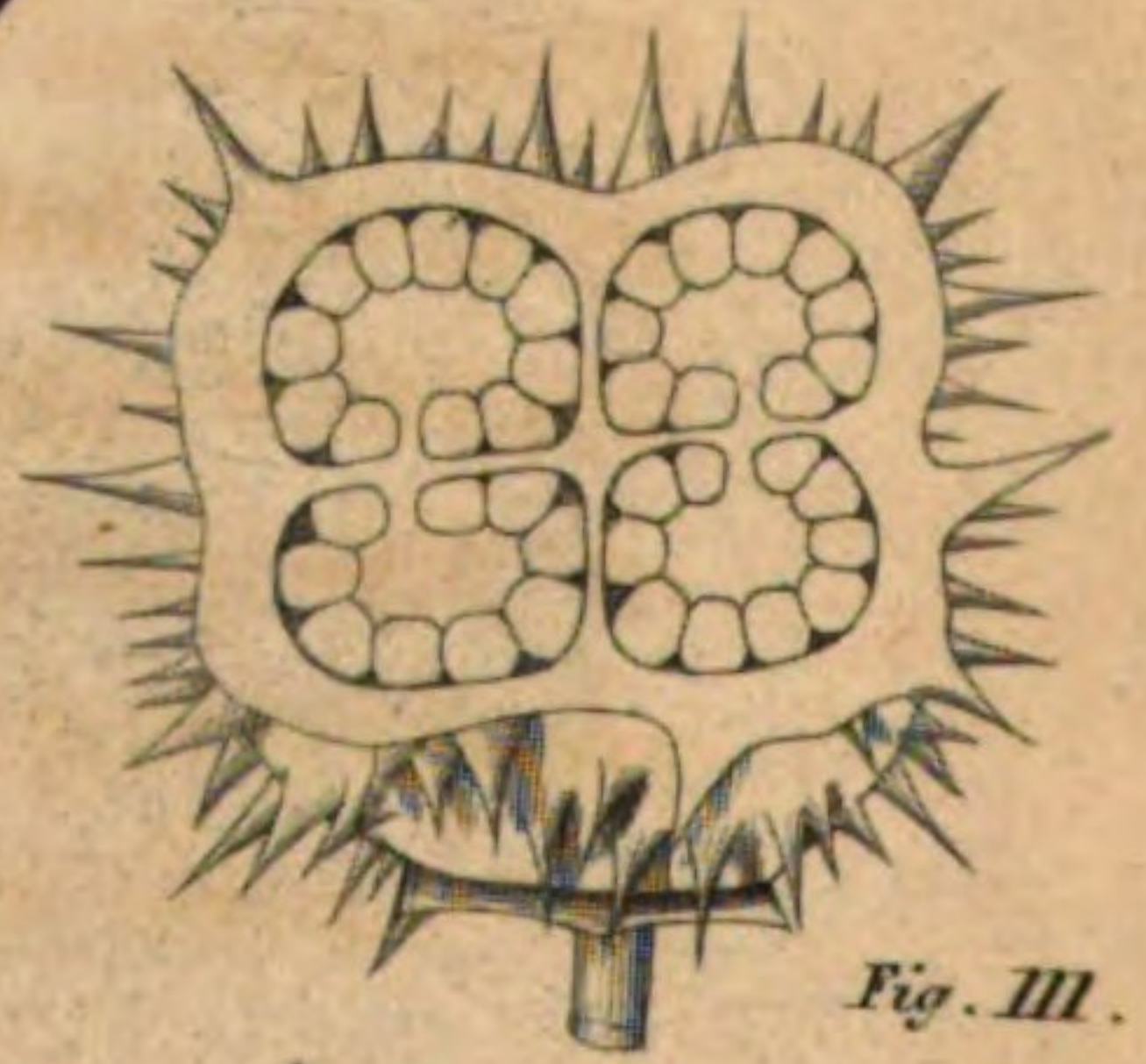
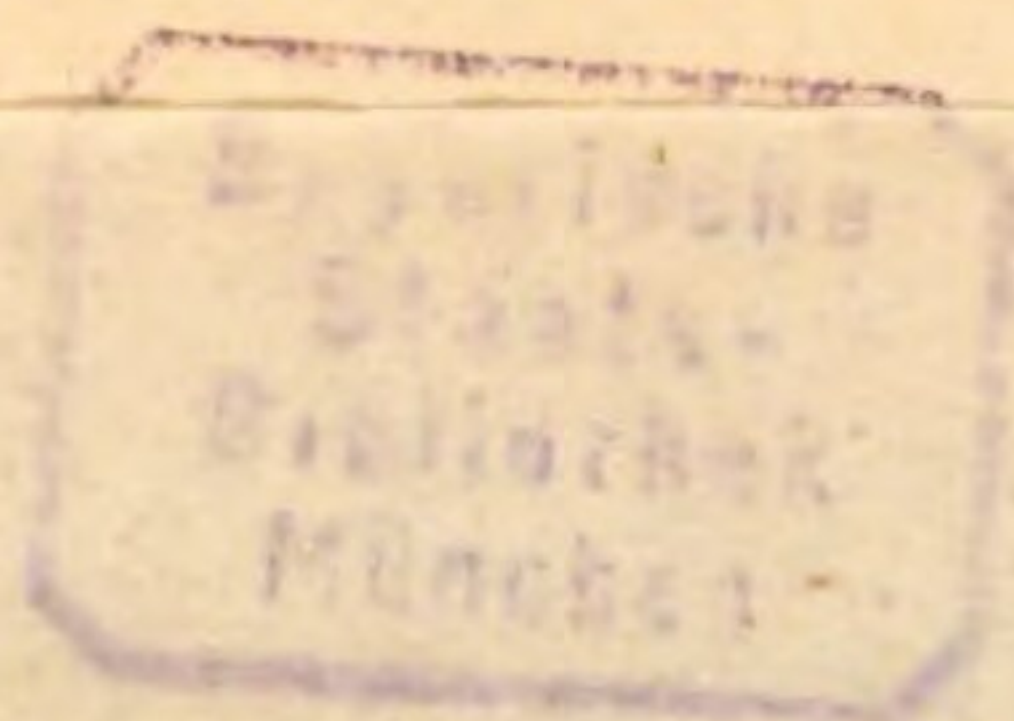


Fig. III.

W.B. Arnott Sc.

Datura Stramonium L.



AMERICAN

MEDICAL BOTANY.

BY J. C. WATSON, M.D.

PH.D.

OF HARVARD UNIVERSITY.

The *Rhus glabra* is a common and hardy shrub, native to the regions of cultivation, and is easily distinguished from the remainder of the family. It occurs in every part of the Atlantic coast from Maine to the Floridas, and is also found in the Western States in the neighbourhood of settlements. Its favorite haunts are the borders of fields and roadsides, among rubbish and in neglected spots of rich ground. It emigrates with great facility, and often springs up in the ballast of ships, and in earth carried from one country to another. This circumstance in Europe has undeservedly given rise to the opinion, that it is originally an American plant. Its native country, however, is doubtful, from



Scramonium B.



AMERICAN

MEDICAL BOTANY.

DATURA STRAMONIUM.

Thorn Apple.

PLATE I.

THE *Datura Stramonium* is a wandering annual plant, which follows the progress of cultivation, and is rarely found remote from the vicinity of dwellings. It occurs in every part of the Atlantic coast from Maine to the Floridas, and is also found in the Western States in the neighbourhood of settlements. Its favorite haunts are the borders of fields and roadsides, among rubbish and in neglected spots of rich ground. It emigrates with great facility, and often springs up in the ballast of ships, and in earth carried from one country to another. This circumstance in Europe has undeservedly given rise to the opinion, that it is originally an American plant. Its native country, however, is doubtful, from

the want of authentic descriptions of sufficient antiquity. One of the oldest satisfactory accounts of it is that of Gerarde in 1597, who has published a description and figure of this plant, and states that it was introduced into England by himself, from seeds received from Constantinople. [Note A.]

Its common name in Europe, derived from the form of its fruit, is *Thorn apple*. In this country its provincial names are *Apple of Peru*, *Devil's apple*, and *Jamestown weed*. It is a plant of rank growth and luxuriant foliage, varying in height from one to six feet, according to the soil in which it grows. In Carolina it begins to flower in May, and in Massachusetts about the latter part of July, and continues until the arrival of frosts.

The *Datura Stramonium* belongs to the first order of the fifth class in the Linnæan artificial arrangement. In its natural order it is found among the *Luridæ* of Linnæus and the *Solanææ* of Jussieu. The following are the essential marks which characterize the genus *Datura*. *The corolla funnel form and plaited. The calyx tubular, angular and deciduous. The capsule four valved.*—Under this genus are comprehended a number of species, a great part of which are natives of warm latitudes. The species *Stramonium* is distinguished from the rest by the follow-

ing character. *Capsules thorny, erect, ovate; leaves ovate, angular, smooth.*—A more particular description of the plant is as follows. Stem erect, simple at bottom, much branched at top by repeated forks, smooth or slightly pubescent, hollow in the large plants, often solid in small ones. Leaves given off from the forks of the stem, five or six inches long, acute, irregularly sinuated and toothed, with large acute teeth and round sinuses, the sides of the base extending unequally down the petiole. Flowers single, axillary, on short stalks, erect or nodding. Calyx composed of one leaf, tubular, with five angles and five teeth, deciduous by breaking off from its base. Corolla funnel shaped with a long tube, five angled, its margin waved and folded, and terminating in five acuminate teeth. Stamens growing to the tube by their filaments, with oblong erect anthers. Germ superior, hairy with the rudiments of spines, ovate; style as long as the stamens; stigma obtuse, parted at base. Capsule ovate, fleshy, covered with thorns, four valved, four celled, opening at top. Seeds numerous, reniform, black, attached to a longitudinal receptacle, which occupies the centre of each cell.

At least two distinct varieties of *Datura Stramonium* are common in the United States. One

of these has a green stalk and white flowers, and agrees with the figures of Sowerby and Woodville, except that the anthers are somewhat longer and the dissepiment of the capsule thinner. The second variety, the one represented in our figure, has a dark reddish stem, minutely dotted with green ; and purple flowers striped with deep purple inside. It is generally a larger plant, and its stem more universally hollow. This variety is probably the *D. tatula* of Linnæus, answering to the description in the *Species plantarum*. The distinguishing marks laid down between the two plants are not sufficient to make them distinct species. I have cultivated both together and watched them throughout their growth, without being able to detect any difference except in colour. Their sensible and medical properties are the same. Sir James Edward Smith has lately informed me, that on consulting the herbarium of Linnæus, the original specimens of *D. Stramonium* and *tatula* did not appear to be more than varieties of the same plant. [*Note B.*]

Every part of the Stramonium, when recent, has a strong, heavy, disagreeable odour, and a bitter, nauseous taste. Taken internally it proves a violent narcotic poison, affecting the mind and body in the most powerful manner. Its usual

consequences when swallowed in considerable quantity, are vertigo and confusion of mind, insensibility of the retina, occasioning dilatation of the pupil and loss of sight, tremors of the limbs and loss of the power of voluntary motion, head-ach, dryness of the throat, nausea and vomiting, anxiety and faintness, and sometimes furious delirium. If the amount taken be large and not speedily ejected from the stomach, the symptoms pass into convulsions or lethargic stupor, which continue till death. When not fatal, its effects, like those of other narcotics, are temporary, disappearing in from one to two days, and frequently in a shorter period.—The remedies to be resorted to in cases of poison from Stramonium, are a prompt emetic, followed by a free use of vegetable acids and strong coffee.

Many stories have been related of the power of this and other species of *Datura* to produce mental alienation, without at the same time materially affecting the body. [*Note C.*] These accounts are generally of somewhat ancient date, and not correspondent with the observations of later physicians. They were suited to those days of credulity, in which the Royal Society of London gravely inquired of Sir Philberto Vernatti, "Whether the Indians can, so prepare the stupifying

herb Datura, that they make it lie several days, months, or years, according as they will have it, in a man's body ; and at the end kill him without missing half an hour's time ?”

Like opium and like other powerful medicines, this plant, when taken in small quantity, and under suitable regulations, proves a remedy of importance, and a useful agent in the hands of physicians. In common with some other narcotics, it seems first to have been introduced freely into practice by Baron Storck of Vienna, as a remedy in Mania, Epilepsy, Convulsions, &c. Many subsequent physicians have given testimony to its efficacy in certain forms of these disorders, yet the instances of its failure have doubtless been more frequent than those of its success. In Murray's *Apparatus Medicaminum* may be found a summary of the reports of many medical men, who have tried it with various success in the diseases in question, as well as in others. Dr. Cullen has no doubt that it may be a remedy in certain cases of mania and epilepsy ; but doubts if any person has learned to distinguish the cases to which it is properly adapted.

Dr. Fisher, President of the Massachusetts Medical Society, has published in their communications some remarks on the employment of Stra-

monium in epilepsy. He divides the cases of that disease into three kinds ; those of which the fits return daily ; those in which they recur at regular periods, as monthly, or give warning of their approach by previous symptoms ; lastly, those in which they do not observe any regular period, and do not give any warning of their approach. In the two first kinds he asserts, that all the cases which came under his care, and which were not very few, had been cured by Stramonium. In those of the third kind he found it of no benefit whatever.

Dr. Archer of Maryland has formed distinctions nearly similar in the application of Stramonium to epilepsy.

In a case of Tic doloureux of long standing I found the extract, taken in as large doses as the stomach would bear, to afford decided relief. Several practitioners have spoken to me of its efficacy in this formidable disease. It should be taken in large doses, and the system kept for some time under its influence.

Within a few years, the thorn apple has attracted much notice, both in Europe and in this country, as an efficacious palliative in Asthma and some other affections of the lungs, when used by smoking, in the same manner as tobacco.

The practice was first suggested by the employment of another species, the *Datura ferox*, for similar complaints, in the East Indies. An English gentleman, having exhausted the stock with which he had been supplied of the oriental plant, was advised by Dr. Sims to have recourse to the common Stramonium as a substitute ; and upon trial, experienced the same benefit as he had done from the former species. This instance of success led to further trials, and in a short time several publications appeared, containing cases of great relief afforded by smoking this plant in the paroxysms of Asthma. Many individuals, of different ages, habits, and constitutions, had used it with the effect of producing immediate relief, and of terminating the paroxysm in a short time. The efficacy however of this medicine was called in question by Dr. Bree, a physician well known by his elaborate treatise on Asthma, who published in the Medical and Physical Journal a letter, containing the result of a great number of unsuccessful trials of Stramonium in asthmatic cases. It may be doubted whether any other physician has been so unfortunate in its use as Dr. Bree, since he affirms that not one case of those under his care was benefitted by it. Certain it is, that in this country the thorn apple is employed with

very frequent success by asthmatic patients, and it would not be difficult to designate a dozen individuals in Boston and its vicinity, who are in the habit of employing it with unfailing relief in the paroxysms of this distressing complaint. The cases, which it is fitted to relieve, are those of pure spasmodic asthma, in which it doubtless acts by its sedative and antispasmodic effects. In those depending upon effusion of serum in the lungs, or upon the presence of exciting causes in the first passages, or elsewhere, requiring to be removed; it must not be expected that remedies of this class can afford benefit. In several cases of plethoric and intemperate people, I have found it fail altogether, and venesection afterwards to give speedy relief.

The part of the plant, which I have employed for smoking, is the leaf prepared in the same way as tobacco. The root, which has commonly been the part used, is more woody and fibrous, and possesses less of the juices of the plant, than its more pulpy and succulent parts. The root also, being strictly annual, has no opportunity to accumulate the virtues of the plant, beyond any other part.

In the seventh volume of the Medico-Chirurgical Transactions, for 1816, is a paper on the

properties of the Stramonium by Dr. Marcet of London, Physician to Guy's Hospital. As the result of his experience, it appeared that this medicine taken internally had relieved acute pains of various kinds more effectually than any other narcotic substance. Its usual effects under his observation, when administered in appropriate doses, in chronic diseases attended with acute pain; were, to lessen powerfully and almost immediately sensibility and pain; to occasion a sort of nervous shock, which is frequently attended with a momentary affection of the head and eyes, with a degree of nausea, and with phenomena resembling those produced by intoxication; to excite in many instances nervous sensations, which are referred to the œsophagus or bronchiæ or fauces, and which sometimes amount to a sense like suffocation; to have rather a relaxing, than an astringent effect on the bowels; to have no marked influence on the pulse, except in a few instances to seem to render it slower; to produce but a transitory and inconsiderable dilatation of the pupil, and to have but little immediate tendency to produce sleep, except from the state of comparative serenity and ease, which follows the preceding symptoms.—In some instances its beneficial effects were obtained without the patient experiencing any of the uneasy sensations above mentioned.

The cases in which Dr. Marcet employed the Stramonium, with their results, appear in the following summary. In four cases of Sciatica, decided benefit was obtained. The efficacy of the medicine was still more strongly marked in two cases of sciatica combined with syphilitic pains. It failed in two instances of diseased hip joint. It produced considerable relief of pain in a case of supposed disease of the spine, followed by paraplegia; and likewise in one of cancer of the breast. It allayed materially the pain occasioned by an acute uterine disease. It was of great and repeated utility in a case of Tic douloureux, its utility in a second case of the same description was very doubtful, and in a third it entirely failed.

There are some authorities for the success of Stramonium in Chorea. Professor Chapman of Philadelphia has found it of use in dysmenorrhea, also with or without mercury in syphilitic and scrophulous ulcers of ill condition.

The external use of Stramonium is of much older date than its internal exhibition. Gerarde in his Herbal, published in 1597, says, "The iuyce of Thorne apples, boiled with hog's grease to the forme of an unguent or salve, cureth all inflammations whatsoever, all manner of burnings or scaldings, and that in very short time, as my-

self have found by my daily practise, to my great credit and profit." Others, since the time of Gerarde, have used this preparation, if not with the same gratifying success, at least with some benefit as an anodyne, sedative application. It mitigates the pain in burns and inflammatory tumors, and promotes the cure of certain cutaneous eruptions. In some irritable ulcers with thickened edges and a sanious discharge, I have found it remarkably efficacious in changing the condition and promoting the granulations and cicatrization. In painful hemorrhoidal tumors the ointment of Stramonium with the ointment of acetate of lead gives, in many cases, very prompt and satisfactory relief, being in this respect inferior to no application, with which I have been acquainted.

Applied topically to the eye, the preparations of Stramonium diminish the sensibility of the retina, and relax the iris. From this effect it is employed by many surgeons to dilate the pupil, as preparatory to the operation for cataract.

The virtues of Stramonium appear to be seated in an extractive principle, which dissolves in water and alcohol, but most readily in the former. It is copiously precipitated from the infusion by muriate of tin. With sulphate of iron it gives a deep green colour, and with gelatin suf-

fers no change. Water distilled from the plant has the sensible qualities in a slight degree, but does not seem to possess the medicinal powers of the plant. Dr. S. Cooper, in a valuable dissertation on this plant, says, that an ounce of the distilled water was taken into the stomach with little or no effect. The same gentleman states, that upon evaporating the infusion of Stramonium, he observed a large number of minute crystals, resembling particles of nitre. Thinking it possible that these might be something analogous to the crystals, said to be obtained by Derosne from opium, and by him denominated the narcotic principle, I repeated the experiment by carefully evaporating separate decoctions of the green and dried leaves. No crystals however were discoverable at any stage of the process, either to the touch, or to the eye assisted by a strong magnifier.

The forms in which the Stramonium is prepared for use are the powder, the inspissated juice, the extract, the tincture and the ointment. The *powder* should be made as soon as the plant is dry, and kept in close stopped bottles.—The *inspissated juice* is made by compressing the bruised leaves in a strong bag, until the juice is forced out. This is to be evaporated in flat vessels at

the heat of boiling salt water to the thickness of honey; it is then suffered to cool, put up in glazed vessels and moistened with alcohol. The *extract* is prepared by immersing a pound of the leaves in three gallons of water and boiling down to one. The decoction should then be strained and stand six hours to settle, after which it may be drawn off and evaporated to the proper consistence. When the seeds are used, the decoction should stand a longer time to separate the oil with which the cotyledons abound, before evaporation. A larger amount of extract may be obtained by boiling the portion, which has been used, a second time in a smaller quantity of water, and mixing the two decoctions before evaporation. For the *tincture* one ounce of the dried leaves is to be digested for a week in eight ounces of proof spirit, and filtrated through paper. In making the *ointment*, a pound of the fresh leaves may be simmered in three pounds of hog's lard until the leaves become crisp. It is then to be strained, and cooled gradually.

The period for gathering the leaves is from the time the plant begins to flower, until the arrival of frost.

As the preparations of Stramonium are liable to vary in strength according to the circumstances

under which they are made, it is always prudent to begin with the smallest dose, and repeat it about three times a day, increasing each dose until the effects begin to appear in the stomach or head.

The commencing doses of the Stramonium, when properly prepared, are as follows.

Of the powdered leaves	1 grain.
powdered seeds	$\frac{1}{2}$ a grain.
inspissated juice or extract	1 grain.
extract of the seeds	from $\frac{1}{4}$ to $\frac{1}{2}$ grain.
tincture	from 15 to 20 drops.

BOTANICAL REFERENCES.

Datura Stramonium, LINNÆUS *Sp. pl. Fl. Suec.* 185 &c.—GRONOVIVS *Fl. Virg.* 23.—ÆDER. *Fl. Danica* 436.—BLACKWELL *t.* 313.—GMELIN *Iter* i. 43.—POLLICH. *Palatin.* 224.—HOFFMANN *Germ.* 77.—ROTH *Fl. Germ.* i. 92 &c.—WOODVILLE *t.* 124.—CURTIS *Lond.* vi. *t.* 17.—SMITH *Fl. Brit.* 254.—*Engl. Bot. t.* 1288.—PURSH *Amer.* 141.—ELLIOTT *Carol.* i. 275.—*Stramonium foliis angulosis &c.* HALLER *Helv.* 586. *Nuci metellæ congener planta*, CAMERARIUS *Epitome* 276.—*Solanum fœtida pomo spinoso, oblongo, &c.* BAUHIN *pin.* 168.—*Stramonium spinosum*, GERARDE *Herbal* 348.

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PLATE I.

Fig. 1. A branch of *Datura Stramonium*, the purple variety, with leaves and flowers.

Fig. 2. Stamens and style.

Fig. 3. Transverse section of the pericarp, shewing the cells, receptacles and seeds.



Eupatorium perfoliatum

Eupatorium verticillatum

Thorough wort.

PLATE II.

The peculiar form and arrangement of the leaves in this plant render it very easy of distinction, and by the most inexperienced botanist. It grows from a rhizome in September, and is found in all the low lands of Florida. It is a perennial plant, with a creeping root, growing most frequently in low, damp places, being connected by horizontal roots. Its common names are *Thorough wort*, *Thorough tea*, *Cross wort*, *Bone set*, &c.

The genus *Eupatorium*, belonging to the first order of the class Syngenesia or Compound flowers, and to the order Corymbifera of Jussieu, is characterized by its naked receptacle, its down simple or rough, its calyx oblong and imbricate,



Iris sibirica

EUPATORIUM PERFOLIATUM.

Thorough wort.

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PLATE II.

THE peculiar form and arrangement of the leaves in this plant render it very easy of distinction at sight by the most inexperienced botanist. It flowers from midsummer to September, and is found in all latitudes from Nova Scotia to Florida. It inhabits meadows and boggy soils, growing most frequently in bunches, the stems being connected by horizontal roots. Its common names are *Thorough wort*, *Thorough wax*, *Cross wort*, *Bone set*, &c.

The genus *Eupatorium*, belonging to the first order of the class Syngenesia or Compound flowers, and to the order Corymbiferae of Jussieu, is characterized by its *naked receptacle*, its *down simple or rough*, its *calyx oblong and imbricate*,

its style longer than the corolla, and cloven half way down. The species *perfoliatum*, exclusively an inhabitant of America, is abundantly distinguished from the rest, by the peculiar form of its leaves, indicated in its name. Michaux has altered the specific name to *connatum* I think injudiciously.

The stems of this plant are erect, round, hairy branched at top only. The leaves, which are perforated by the stem, are rather perfoliate than connate, since they have not the character of two leaves joined together, but of one entire leaf, having its four principal veins proceeding at right angles from the four quarters of the stem, two of them being situated in the place of the supposed junction. The upper leaves however are generally divided into pairs. The main leaves are acuminate, decreasing gradually in breadth from the stem, where they are widest, to the extremities. They are serrated, wrinkled, pale underneath, and hairy, especially on the veins. Flowers in corymbs with hairy peduncles. Calyx cylindrical, imbricate, the scales lanceolate, acute, hairy. Each calyx contains about twelve or fifteen florets, which are tubular, with fine spreading segments, and surrounded with a rough down. The stamens in each consist of five soft filaments, with blackish anthers

united with a tube. Style filiform, divided into two branches, which project above the flower. Seeds oblong on a naked receptacle.

Every part of the *Eupatorium* has an intensely bitter taste, combined with a flavour peculiar to the plant, but without astringency or acrimony. The leaves and flowers abound in a bitter extractive matter, in which the important qualities of the plant seem to reside. I find this principle to be alike soluble in water and alcohol, imparting its sensible qualities to both, and neither solution being rendered turbid, at least for some time, by the addition of the other solvent. It forms copious precipitates with many of the metallic salts, such as muriate of tin, nitrate of mercury, nitrate of silver, and acetate of lead. Of the mineral acids, the sulphuric and muriatic form slight precipitates with the aqueous decoction; the oxymuriatic, a more copious one; the nitric, in my experiments, gave no precipitate, but changed the colour to a red. In the alcoholic solution the oxymuriatic alone formed an immediate precipitate. Tannin exists very sparingly in this plant. A solution of isinglass produced a slight precipitate from the tincture, and a hardly perceptible turbidness in separate decoctions of the leaves and flowers. Sulphate of iron gave a dark green precipitate, which par-

tially subsided in a short time.—In distillation, water came over very slightly affected with the sensible qualities of the plant, and not alterable by sulphate of iron.

A dissertation of merit on this plant was published a few years since by Dr. Anderson of New York, in which he gives the details of numerous and elaborate chemical trials, made by him on different parts of the plant. He concludes, among other things, from his experiments, that the active properties of the plant reside in greatest quantity in the leaves, and that its virtues are readily obtained by means of a simple decoction.

The medical powers of Eupatorium are such as its sensible properties would seem to indicate, those of a tonic stimulant. Given in moderate quantities, either in substance or in cold infusion or decoction, it promotes digestion, strengthens the viscera, and restores tone to the system. Like other vegetable bitters, if given in large quantities, especially in warm infusion or decoction, it proves emetic, sudorific, and aperient. Even in cold infusion it tends to bring on diaphoresis.

This plant has been long in use in different parts of the United States, for the same purposes for which the Peruvian bark, Gentian, Chamomile, &c. are employed. It has been found competent

to the cure of intermittent fevers by various practitioners in the middle and southern states. Dr. Anderson has detailed six cases of intermittents, quotidian, tertian, and quartan, out of a large number which had been successfully treated within his own observation by the Eupatorium both in substance and decoction. In these cases the cures were certainly expeditious, and took place at as early a period as could have been expected from arsenic or the Peruvian bark. Dr. A. cites the experience of several distinguished practitioners, particularly Dr. Hosack of New York and the late Dr. Barton of Philadelphia, in confirmation of his own, to shew that the Eupatorium is an efficacious remedy in the treatment of various febrile disorders, also of many cutaneous affections, and diseases of general debility.

I have prescribed an infusion of the Eupatorium in various instances to patients in the low stages of fever, where it has appeared instrumental in supporting the strength and promoting a moisture of the skin, without materially increasing the heat of the body. I have also found the cold infusion or decoction a serviceable tonic in loss of appetite and other symptoms of dyspepsia, as well as in general debility of the system.

The warm infusion is a convenient substitute for that of chamomile flowers in facilitating the operation of an emetic.

When employed as a tonic, this plant may be taken in powder in doses of twenty or thirty grains, or a teacup full may be used of the infusion, rendered moderately bitter. When intended to act as an emetic, a strong decoction may be made from an ounce of the plant in a quart of water, boiled to a pint.

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PLATE II.

Fig. 1. *Eupatorium perfoliatum*.

Fig. 2. A flower magnified.

Fig. 3. A floret magnified.

Fig. 4. Tube of anthers with the style running through.

It is a common mistake to suppose that the
operation of the mind is a mere passive
reception of impressions from without. It is
not so. The mind is an active power, and
it is its province to select, to compare, to
judge, and to reason. It is its province to
form ideas, and to connect them together
in a system of knowledge. It is its province
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Fig. 1.

Fig. II.

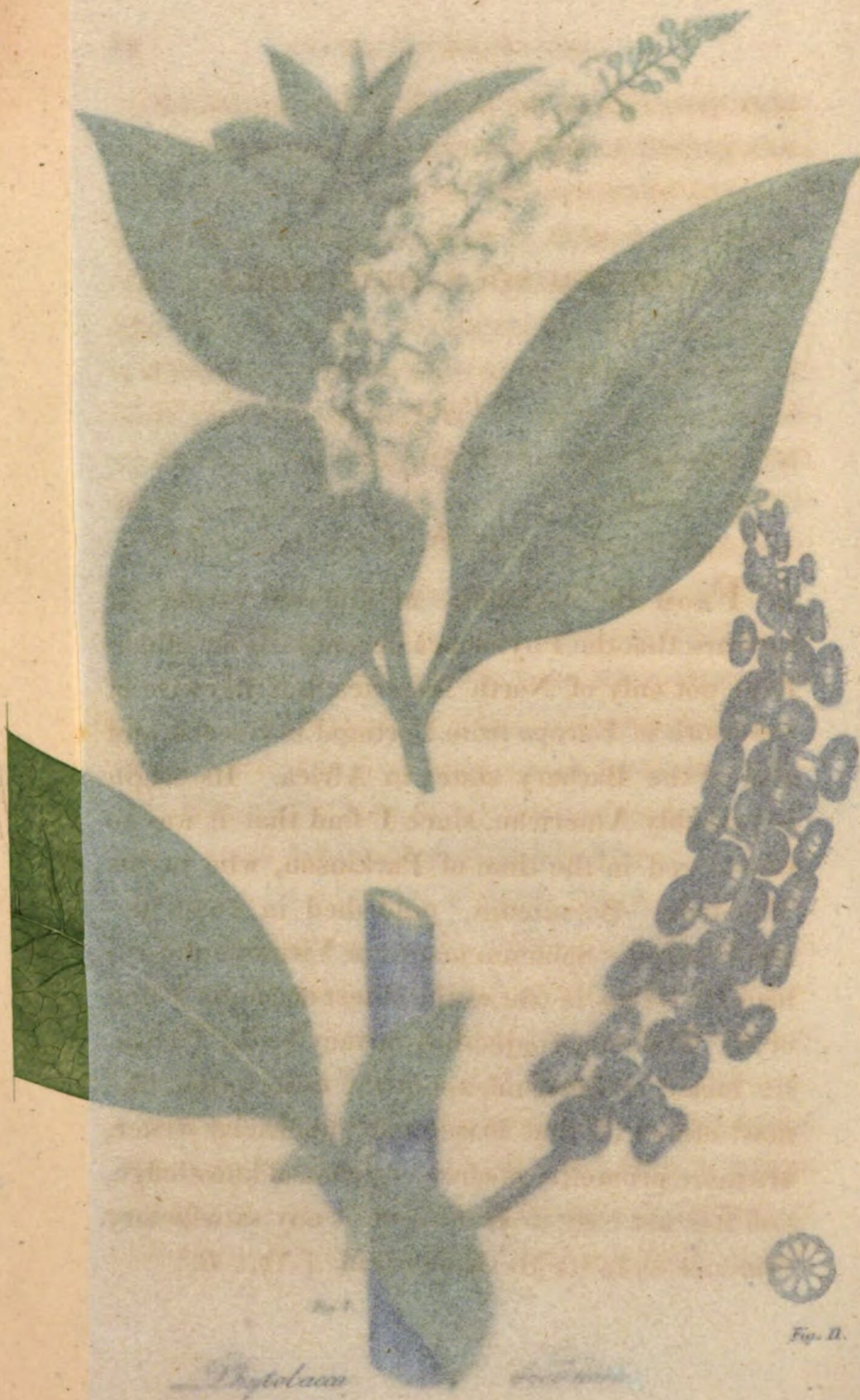
Phytolacca

decandra

PHYTOLACCA DECANDRA.

Poke.

From the numerous old authors to whom it appears, that the *Physalis* described by all inhab-
itants not only of North America, but likewise of
the north of Europe from Portugal to Russia, and
also of the Herbaries of the Alps. Its origin
is probably American, since I find that it was first
considered in the time of Parkinson, who in his
Theatrum Botanicum, published in 1629, first
nominates it "*Solanum elegans Vegetabilis* *per-
brum*." This is one of the oldest accounts I find
of it. Plukenet conjectures it may be the *Cuechi-
liz tomatl* of Hernandez, but the description, like
most others of that loose and superficial writer,
are more promotive of obscurity than of knowledge,
and it is not easy to draw from it any satisfactory
evidence as to its Mexican origin. [Note D.]



Phytolacca

Fig. II.

PHYTOLACCA DECANDRA.

Poke.

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PLATE III.

FROM the testimony of different writers it appears, that the *Phytolacca decandra* is an inhabitant not only of North America, but likewise of the south of Europe from Portugal to Greece, and also of the Barbary states in Africa. Its origin is probably American, since I find that it was so considered in the time of Parkinson, who in his *Theatrum Botanicum*, published in 1640, denominates it "*Solanum magnum Virginianum rubrum.*" This is one of the oldest accounts I find of it. Plukenet conjectures it may be the *Cuechiliz tomatl* of Hernandez, but the description, like most others of that loose and superficial writer, are more promotive of obscurity than of knowledge, and it is not easy to draw from it any satisfactory evidence as to its Mexican origin. [*Note D.*]

In the autumnal months no plant among us is more remarkable than the *Phytolacca* for its large size, and the fine colour of its clusters of berries. Its most general appellation is *Poke*, an abbreviation, perhaps, of *Pocan*, the name by which it was known in Virginia a century ago. In New England it is more frequently called *Garget*, *Cocum*, *Jalap* and *Pigeon berries*.

Jussieu has arranged this genus among his *Atriplices*, and Linnæus with the *Oleraceæ*.

The number of its stems and styles, place it in the class *Decandria* and order *Decagynia*. Its generic character consists in having *no calyx, a corolla of five petals, and its berries superior with ten cells and ten seeds*. The species *decandra* is the only one which strictly agrees with its class and order, and is known by having *ovate leaves, acute at both ends, and its flowers with ten stamens and styles*.

The root of this plant is of large size, frequently exceeding a man's leg in thickness, and is usually divided into two or three principal branches. Its substance is fleshy and fibrous, and easily cut or broken. Internally it is distinctly marked with concentric rings of considerable thickness, while its outer surface is covered with a very thin brownish bark, which seems to be little more than a cu-

ticle. The stalks, which are annual, frequently grow to the height of six, and even nine feet. They are round, smooth, and very much branched. When young, their usual colour is green, but in most plants, after the berries have ripened, they are of a fine purple. The leaves are scattered, petioled, ovate-oblong, smooth on both sides, ribbed underneath, entire, acute. The flowers grow on long pedunculated racemes opposite to leaves. Peduncles nearly smooth, angular, ascending. Pedicels divaricated, sometimes branched, green, white, or purple, furnished with a small linear bracte at base, and two others in the middle. Calyx none. Corolla resembling a calyx, whitish, consisting of five round-ovate, concave, incurving petals. Stamens ten, rather shorter than the petals, with white, roundish, two lobed anthers. Germ greenish, round, depressed, ten furrowed. Styles ten, short, recurved. The flowers are succeeded by long clusters of dark purple berries, almost black, depressed or flattened, and marked with ten furrows on the sides.

The dried root is light coloured and spongy, with a mild and somewhat sweetish taste. A part of it is soluble both in water and alcohol, and neither of these substances renders turbid the solution in the other, unless the solution has been in-

spissated by long boiling. The soluble portion appears neither resinous nor mucous. It approaches most nearly to extractive, but has characters somewhat peculiar to itself. A decoction of the root procured by boiling for ten minutes in distilled water, exhibited after filtration the following results. It was transparent, nearly colourless, and did not alter litmus. It gave no precipitate with the sulphuric, nitric, muriatic, oxymuriatic, and acetic acids. It gave no precipitate with the sulphate of iron, but formed a copious one with the nitrates of mercury and silver, and the acetate of lead. Muriate of tin produced no effect at first, but after standing, a light precipitate took place. Pearl ash, lime water, and muriate of barytes rendered the solution turbid. Acetate of barytes occasioned no change. Oxymuriate of lime formed an immediate precipitate.

The cold infusion exhibited nearly the same results as the decoction. The alcoholic solution underwent no change from muriate of tin, but threw down a dense precipitate with nitrate of mercury.

From the above experiments it appears, that the soluble principle of the *Phytolacca* differs from common vegetable extractive, as defined by the chemists, in several respects, particularly in

not being thrown down by the oxymuriatic or other mineral acids, and in being but partially affected by muriate of tin.

In the *Annales de Chimie*, vol. lxxii, is a memoir on the Chemical properties of the *Phytolacca decandra* by M. Braconnot. His experiments indicate the presence of an unusual quantity of vegetable alkali in this plant. He found that the ashes, procured by incinerating the stalks, afforded nearly 67 per cent. of dried alkaline carbonate, and 42 per cent. of pure caustic potash. This alkali in the plant is neutralized by an acid having considerable affinity to the malic, but with a few shades of difference. With lime and lead malic acid forms flocculent precipitates, very easily soluble in distilled vinegar, but those with the phytolaccic acid are insoluble. M. Braconnot thinks this acid may probably be a mean between the malic and oxalic acids, or an oxygenized malic acid.

The same memoir contains an examination of the colouring matter in the berries of the *Phytolacca*. The juice of these berries is of a very fine, bright purple colour, but this colour is extremely fugacious and disappears in a short time from cloth or paper that has been tinged with it. A few drops of lime water added to this purple

juice change it to a yellow colour, but the smallest quantity of acid is sufficient to restore its purple hue. Exposure to the air or large dilutions is sufficient to restore the original purple.

M. Braconnot considers the yellow liquor produced by the juice of these berries and lime water as one of the most delicate tests of the presence of acid. Into two glasses he put equal quantities of the juice made yellow and of an infusion of litmus of equal depth of colour. More than sixty drops of a very weak acid were required to redden the infusion of litmus, but less than fifteen restored the purple colour of the *Phytolacca*. Hence it follows, that the yellow liquor is four times as sensible to the presence of acid, as the infusion of litmus. It however requires to be used immediately after it is prepared, since a few hours cause a spontaneous change in it, which begins with a precipitate, and ends with a deprivation of colour.

The effects produced on this purple colour by other reagents were as follows. Pure alkalis gave it a yellow colour. Alkaline subcarbonates a violet, that fades and becomes yellow by standing. Weak acids no perceptible change. Dilute oxymuriatic acid a complete deprivation of colour with white flocculi. Alum nothing at first, but

after some days, a very light red precipitate. Muriate of lime no change. Muriate of tin a red sediment inclining to lilac, leaving the fluid colourless. Nitrate of lead a precipitate of the colour of wine lees. Super oxidized sulphate of iron, a dirty violet.

Many of the above experiments I have repeated, and added others. The yellow colour produced by the alkalis borders on green. Pure strontian produces the same change as potash and lime. Pure barytes wholly discharges the colour on standing a short time. Acetate of lead forms a scarlet precipitate, leaving the liquid nearly colourless.

The purple colour that tinges the cuticle of the stalks of the *Phytolacca* is stated in the above memoir, to be of the same nature as that in the berries, and to afford the same results.

The taste of the berries is sweetish and nauseous, leaving behind a very slight sense of acrimony. M. Braconnot, found that at a moderate temperature, the juice underwent the vinous fermentation, and yielded alcohol by distillation. Dr. Shultz procured from half a bushel of the berries six pints of spirit sufficiently strong to take fire and burn with readiness.

In its medicinal properties the root of the *Phytolacca decandra* approaches nearer to *ipecacuanha* than any American vegetable, I have hitherto examined. From abundant experience, the result of many trials made in Dispensary practice, I am satisfied that, when properly prepared, it operates in the same doses and with the same certainty, as the South American emetic. Ten grains of the powder will rarely remain on the stomach, and twenty or thirty produce a powerful operation, by emesis and generally by catharsis. In its mode of operation, this medicine has some peculiarities, a part of which are favorable, others disadvantageous. Its advantages are, that it operates with ease, and seldom occasions pain or cramp. Its disadvantages are, 1. That it is slow in its effects, frequently not beginning to operate until an hour, and sometimes two hours after it is taken. 2. That it continues to operate for a greater length of time than is usual for emetics, although as far as I have been able to observe, it is readily checked by an opiate. These disadvantages however are not constant. I have repeatedly known it commence operating in fifteen minutes, and cease after four or five ejections. The representations of patients as to any unpleasant feelings under its effects, are not greater than we should

naturally expect, when it is recollected, that no emetic is altogether comfortable in its operation. Dr. Fisher of Beverly* informs me that whenever he has used the *Phytolacca*, it has performed its duty as an emetic perfectly well, and that in one patient, a female of irritable stomach, in whom previous emetics had always excited severe spasms, ten grains of the *Phytolacca* operated effectually, and no spasm followed.

I have sometimes observed slight narcotic symptoms during the operation of *Phytolacca*, particularly vertigo. But others have not always met with this symptom. Dr. George Hayward of this town, who has had much experience with this medicine, the results of which were communicated to the Linnæan society, and afterwards published in the New England Journal, October 1817, states that in doses of a scruple, he never noticed any dizziness, or stupor from it, although he had always been particular in his inquiries to know if any such symptoms took place. The above dose was administered by him in nearly thirty cases, in all of which, except in one case, it operated as an emetic and cathartic, usually three or four times, thoroughly, though not severely, generally commencing its operation on the stom-

* Letter dated November, 1815.

ach in an hour, and rarely continuing longer than four. He found it to excite little or no nausea previous to its operation, and though it made a powerful impression on the system, it never produced any disagreeable or unusual symptoms.

Dr. Hayward also made trial of the powder of the leaves, which he found to possess the same properties with that of the root, but to be less effectual and less certain in its operation. He also prepared a tincture, decoction, and wine of the root; but all these were inferior to the medicine in substance, being less certain in their effect, and sometimes giving rise to troublesome symptoms.

Dr. Shultz of Pennsylvania, author of an inaugural dissertation on the *Phytolacca decandra*, gave the expressed juice of the leaves, berries, and roots, in considerable quantity to animals. It operated by emesis and catharsis, attended with drowsiness. The juice of the root was most active. He also gave to a dog two ounces of the spiritous liquor distilled from the berries. It occasioned nausea and drowsiness, with slight spasmodic motions, but no vomiting.

In the same dissertation, Dr. Shultz refers to several instances of persons who had incautiously eaten large quantities of the root through mistake. Its effects were violent vomiting and purging,

prostration of strength, and in some instances convulsions.

The *Phytolacca* has had some reputation in the treatment of rheumatism. Dr. Griffiths, formerly a professor in the University of Pennsylvania, found it of great use in Syphilitic rheumatism. Dr. Hayward however states, that he derived no advantage from its employment in rheumatic affections.

The young shoots of this vegetable are destitute of medicinal qualities, and are eaten in the spring in some parts of the United States, as substitutes for asparagus. At this time the *succus proprius* or returning juice of the plant is not yet formed by exposure of the sap to the atmospheric air, in the leaves. The ripe berries are less noxious than the green, and are devoured by several species of birds. In Portugal and in France they were formerly employed to improve the colour of red wines, until the interference of government became necessary to put a stop to the practice.

The external application of *Phytolacca* has been found useful in a variety of cases, by its action as a local stimulant. The ointment and extract have commonly been employed for this purpose. These preparations usually excite a sense of

heat and smarting on being first applied. I have cured cases of psora with the ointment, and Dr. Hayward states, that he found it successful in cases where sulphur had failed. A case of tinia capitis of twelve years' standing, which had resisted various kinds of treatment, was also cured by this application.

The Phytolacca is one of those vegetables which has had its temporary reputation for the cure of cancer. For this purpose it has been resorted to in various parts of the world, and many men of science have been convicts to its efficacy, among whom were Dr. Colden and Dr. Franklin of our country. [*Note E.*] But like other vegetable specifics for cancer, it owes its character to an imperfect discrimination of that disease, and a misapplication of the name. All that can be strictly inferred from the various accounts we have had on this subject, is, that the plant has often proved useful in malignant ulcers by its stimulating and almost escharotic effects, frequently producing an eschar, and thus altering the condition of the ulcerated surface.

For internal use no preparation of the Phytolacca is to be preferred to the powder, of which from ten to fifteen grains is often a sufficient emetic.

The root should be dug late in autumn or during the winter. It should be cut in transverse slices and dried. After being pulverized, it should be kept in close stopped phials. The stock should be annually renewed, as its activity is impaired by age.

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PLATE III.

Fig. 1. *Phytolacca decandra* in flower and in fruit.

Fig. 2. Section of a berry.

ARUM TRIPHYLLUM.

Dragon root.

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PLATE IV.

IT appears, that both North and South America give rise to this species of Arum, which is so versatile in its constitution as to bear the winters of Canada, and the perpetual summer of Brazil. In its structure it is one of our most singular vegetables, and in colour one of the most variable. It grows in swamps and damp shady woods, and is universally known among us by the names of *Dragon root* and *Indian turnip*.

The class to which the family of Arums belong, is rendered somewhat obscure by the variation of the species. Most botanists have placed them in the class *Monœcia*, others in *Polyandria*. The species under consideration is undoubtedly *Polygamous*. In natural arrangements, the Arums



Fig. I.

Fig. III.

Fig. 2.

Fig. IV.

Arum lilyphyllum

ARUM TRIPHYLLUM

Dragon root.

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Fig. II.

Fig. III.

Fig. I.

Fig. IV.

Arum triphyllum

are found under the *Piperitæ* of Linnæus and the *Aroideæ* of Jussieu.

The genus *Arum* may be characterized as follows. *Spathe* one leaved, convolute at base; *spadix* naked above, bearing the organs of fructification at base; berries one celled.

The species *triphyllum* is polygamous; has its leaves ternate and entire; its scape bearing an ovate, acuminate, inflexed spathe; its spadix club-shaped, shorter than the spathe.

The root is round and flattened, its upper part tunicated like the onion, its lower and larger portion tuberous and fleshy, giving off numerous long white radicles in a circle from its upper edge. It is covered on the under side with a dark, loose, wrinkled skin. Leaves usually one or two on long sheathing footstalks, composed of three oval, mostly entire, acuminate leaflets, which are smooth, paler on the under side, and becoming glaucous as the plant grows older, the two lateral ones somewhat rhomboidal. Scape erect, round, green or variegated with purple, invested at base by the petioles, and by their acute sheaths. This supports a large, ovate, acuminate spathe, convoluted into a tube at bottom, but flattened and bent over at the top, like a hood. Its internal colour is exceedingly various, even in plants growing to-

gether. In some it is wholly green, in others dark purple or black. In most it is variegated, as in our figure, with pale greenish stripes on a dark ground. The spadix is much shorter than the spathe, club shaped, rounded at the end, green, purple, black, or variegated, suddenly contracted into a narrow neck at base, and surrounded below by the stamens or germs. In the barren plants, its base is covered with conical, fleshy filaments, bearing from two to four circular anthers each. In the fertile plants, it is invested with roundish crowded germs, each tipped with a stigma. Plants which are perfectly monœcious, and which are the least common, have stamens below the germs. There are also frequently found irregular, reniform substances, much larger than the anthers, of which they seem to be a disease. The upper part of the spadix withers with the spathe, while the germs grow into a large compact bunch of shining scarlet berries.

Every part of the Arum, and especially the root, is violently acrid, and almost caustic. Applied to the tongue or to any secreting surface, it produces an effect like that of Cayenne pepper, but far more powerful, so much so, as to leave a permanent soreness of many hours' continuance. Of this any one may become satisfied by a simple

application of the root to his mouth. Its action does not readily extend through the cuticle, since the bruised root may be worn upon the external skin until it becomes dry, without occasioning pain or rubefaction.

The acrid property, which resides in this and other species of *Arum*, appears to depend upon a distinct vegetable principle in Chemistry, at present but little understood. It is extremely volatile, and disappears almost entirely by heat, drying, or simple exposure to the air. I have endeavoured, with but partial success, to obtain it in a separate state, or in any perceptible combination. The following were some of the methods by which it was attempted.

Portions of the fresh contused root were separately digested in water, in proof spirit, in alcohol, in ether, in olive oil and in vinegar. The infusions were tasted at different periods, but none of them had acquired the least acrimony from the plant.

The expressed juice of the root upon standing one minute had lost all its pungency.

A quantity of the bruised root was placed in a retort and covered with water. Heat was gradually applied, until a fluid began to collect in the receiver. This fluid had the peculiar odour of

the root, but was wholly without acrimony. The same experiment was repeated with alcohol, and vinegar, and afforded similar results. In every case the liquid remaining in the retort was also without pungency.

Some slices of the root were digested in proof spirit in a close stopped phial. The portions of root retained their acrimony at the end of some weeks, but had imparted none to the spirit. At the end of two years, the root was examined and found destitute of acrimony, as were also the whole contents of the phial.

Suspecting that the acrid principle of this plant must escape in form of gas during the processes which have been mentioned, the following experiment was made. A quantity of the bruised root and stalks were placed in a vessel of water. A glass receiver was filled with water and inverted over them, and sufficient heat applied to raise the water nearly to the boiling point. From the beginning of the process, bubbles of air continued to escape from the plant, and were collected in the upper part of the receiver. In the course of half an hour, a considerable quantity of permanent gas was obtained. A part of this gas, after cooling, was transferred to a phial, in which was a small quantity of atmospheric air. On pre-

senting a lighted paper to the mouth of this phial, it exploded with a very distinct report. Another portion of the gas was agitated with lime water, which it rendered turbid. This circumstance was probably owing to the mixture of carbonic acid disengaged from the plant, or from the water by boiling.

From the above experiments, which circumstances did not permit me to pursue, it appears that the acrimony of the Arum resides in a principle having no affinity for water, alcohol, or oil, being highly volatile, and, in a state of gas, inflammable. The products of its combustion, as well as its other affinities, remain to be investigated.*

The acrimony of the Arum when fresh is too powerful to render its internal exhibition safe. The roots, when dried whole, retain a small portion of their pungency, and in this state they have been given by some practitioners in the country for flatulence, cramp in the stomach, &c. also for

* The acrimony of the Ranunculi, which approaches that of the Arum, is lost by drying, yet is soluble in water, and passes over with it in distillation. That of Polygonum hydropiper disappears in decoction and distillation. The same takes place with several other acrid plants which I have examined. Some inquiries into the *acrid principle* of vegetables I am in hopes to render more mature at a future period.

asthmatic affections. As topical stimulants, they promise to be useful when any method shall have been discovered of fixing and preserving their acrimony. The late Dr. Barton of Philadelphia observes, that "the recent root of this plant boiled in milk, so as to communicate to the milk a strong impregnation of the peculiar acrimony of the plant, has been advantageously employed in cases of consumption of the lungs." This statement however should be qualified by the recollection, that the Arum imparts none of its acrimony to milk upon boiling. An impression of this kind can only have been received from a partial mixture of the substance of the root with the milk.

The root contains a large proportion of very pure white fæcula, resembling the finest arrow root or starch. To procure this, the fresh root should be reduced to a pulp, and placed on a strainer. Repeated portions of cold water should then be poured on it, which in passing through the strainer carry with them the farinaceous part, leaving the fibrous portion behind. The fæcula thus obtained, loses its acrimony on being thoroughly dried, and forms a very white, delicate and nutritive substance. Dr. M'Call of Georgia found these roots to yield one fourth part of their weight of pure amylaceous matter.—It is not uncommon

for a nutritious fæcula to exist in pungent and poisonous roots. The Laplanders prepare a wholesome bread from the acrid roots of *Calla palustris*, and the juice of the *Cassava*, or bread root tree of the West Indies, is known to be highly deleterious while recent. [Note F.]

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PLATE IV.

Fig. 1. *Arum triphyllum*.

Fig. 2. *Spadix with anthers*.

Fig. 3. *Spadix with germs*.

Fig. 4. *Longitudinal section of the root*.

COPTIS TRIFOLIA.

Gold thread.

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PLATE V.

THE dark sphagnous swamps, which in the northern parts of our continent are covered with a perpetual shade of firs, cedars and pines, are the favourite haunts of this elegant little evergreen. The coldest situations seem to favour its growth, and it flourishes alike in the morasses of Canada and of Siberia. On our highest mountain tops it plants itself in little bogs and watery clefts of rocks, and perfects its fructification in the short summer allowed it in those situations. I have gathered it upon the summit of the Ascutney in Vermont, and on the Alpine regions of the White mountains. It is here that in company with the *Diapensia* and *Azaleas* of Lapland, the blue *Menziesia*, the fragrant Alpine *Holcus*, and other plants



Coptis japonica

CORYS TRIPHYLLA

The dark spruce-covered mountains, which in the northern part of the continent are covered with a perpetual snow, and the pines, are the favorite haunts of this elegant little evergreen. The elevated situations seem to favour its growth, and it flourishes alike in the morasses of Canada and of Siberia. On our highest mountain tops it grows in little bogs and watery clefts of rocks, and even bears its fruit in the short summer. It is in these situations. I have gathered it upon the summit of the Ascutney in Vermont, and on the Alpine regions of the White mountains. It is here that in company with the Hesperis and Azaleas of Lapland, the blue Menziesia, the fragrant Alpine Holcus, and other plants



Fig. I.



Fig. II.



Fig. III.

Coptis trifolia

of high northern latitudes, it forms the link of botanical connexion between the two continents. When in situations like this, we seem transported to the frigid zone, and to be present at the point where the hemispheres approach each other, as if to interchange their productions.*

In the second volume of the *Amœnitates Academicæ* is a description and imperfect figure of this plant as brought from Kamschatka, by Hælinius. He describes it by the name *Helleborus trifolius*, with the observation, "Minima est hæc planta in suo genere, attamen spectabilis." Subsequent botanists have ranked it with the Hellebores, until Mr. Salisbury very properly separated it from a family of plants, with which it wholly disagrees in habit, and constituted a new genus by the name of *Coptis*. This genus is characterized by the following marks. *Calyx none; petals five or six, caducous; nectaries five or six, cucullate; capsules from five to eight, pedicelled, beaked, many seeded.* The species *trifolia* has *ternate leaves, and a one flowered scape.*

* "Non sine admiratione vidi non solum multas cum rarissimis nostris plantis Lapponicis communes, sed etiam alias, partim ignotas omnino, partim minime tritas et denique quasdam etiam cum Canadensibus easdem, argumento Canadam a Camscatca non longe distare, uti sequentes antea in sola America boreali visæ, nunc etiam in extrema ora Siberiæ."

Amœnitates Academicæ, ii. 310.

In botanical arrangements, the *Coptis* will follow the *Hellebores*, from which it was taken, remaining in the class and order *Polyandria*, *Polygynia*, with the *Multisiliquæ* of Linnæus and the *Ranunculaceæ* of Jussieu.

The roots of this plant, from which the name of *goldthread* is taken, are perennial and creeping. On removing the moss and decayed leaves from the surface of the ground, they discover themselves of a bright yellow colour, running in every direction. The bases of the new stems are invested with a number of yellowish, ovate, acuminate stipules. Leaves ternate, on long slender petioles; leaflets roundish, acute at base, lobed and crenate, the crenatures acuminate; smooth, firm, veiny. Scape slender, round, bearing one small, starry white flower, and a minute, ovate, acute bracte at some distance below. Calyx none. Petals five, six or seven, oblong, concave, white. Nectaries five or six, inversely conical, hollow, yellow at the mouth. Stamens numerous, white, with capillary filaments and roundish anthers. Germs from five to seven, stipitate, oblong, compressed; styles recurved. Capsules pedicelled, umbelled, oblong, compressed, beaked, with numerous black oval seeds attached to the inner side.

The root of this plant is a pure intense bitter,

scarcely modified by any other taste. In distillation it communicates no decided sensible quality to water. The constituent with which it most abounds is a bitter extractive matter, soluble both in water and alcohol. It seems destitute of resinous or gummy portions, since the residuum from an evaporated solution in alcohol is readily dissolved in water, and vice versa. It is devoid of astringency when chewed in the mouth, and it gives no indication of the presence of tannin or gallic acid when tested with animal gelatin, or with sulphate of iron. The abundance of the bitter principle is evinced by the acetate of lead and nitrate of silver, both of which throw down a copious precipitate. The sulphuric, nitric, and muriatic acids occasion no change, and the muriate of tin gives only a slight precipitate, after some time standing.

Of this article larger quantities are sold in the druggists' shops in Boston, than of almost any indigenous production. The demand for it arises from its supposed efficacy as a local application in aphthous, and other ulcerations of the mouth. Its reputation however in these cases is wholly unmerited, since it possesses no astringent or stimulating quality, by which it can act on the ulcerated spots, and where benefit has attended its use, it is doubtless to be ascribed to other articles

possessing the above properties, with which it is usually combined.

As a pure tonic bitter, capable of strengthening the viscera and promoting digestion, it is entitled to rank with most articles of that kind now in use. Its character resembles that of Gentian, Quassia, and Columbo, being a simple bitter without aroma or astringency. The tincture, made by digesting half an ounce of the bruised root in eight ounces of diluted alcohol, forms a preparation of a fine yellow colour, possessing the whole bitterness of the plant. I have given it in various instances to dyspeptics and convalescents, who have generally expressed satisfaction from its effects, at least, as frequently as from other medicines of its class. A teaspoonful may be taken three times a day. In substance, it rests well on the stomach in doses of ten or twenty grains. It is however difficult to reduce to powder on account of the tenacity of its fibres.

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PLATE V.

Fig. 1. *Coptis trifolia* with the root, leaves, flowers and last year's fruit.

Fig. 2. Nectaries, stamens, and pistils magnified.

Fig. 3. Section of a capsule shewing the seeds.

ARBUTUS UVA URSI.

Bear berry.

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PLATE VI.

FEW shrubs are more extensively diffused throughout the northern hemisphere, both in the old and new continents, than this trailing evergreen. We are told that it abounds in the northern parts of Europe, in Sweden, Lapland, and Iceland, and extends southerly to the shores of the Mediterranean. In Siberia it is also found, and is represented as abundant on the banks of the Wolga. In North America it grows from Hudson's bay as far south, at least, as the central parts of the United States. It occupies the most barren places, such as gravelly hills and dry, sandy woods, and covers the ground with beds of considerable extent.



old and new. It is a very common plant in the south
 west of Europe, in various parts of Asia, and in
 the island of Madagascar. It is also found in the
 mountains of the Himalayas, and in the high
 parts of the United States. It is a very hardy
 plant, and is often used for medicinal purposes.
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The ... the ... old and ... green. ... ern parts of ... land, and ... Mediterranean. ... represented as ... Wolga. In ... son's bay ... parts of the United States. ... barren places, such as ... sandy woods, and covers the ground to a considerable extent.



Fig. I.



Fig. II.



Fig. III.



Fig. IV.



Fig. V.

Arbutus Uva ursi

The family of plants bearing the name of *Ar-*
butus have for their distinctive characters a large
 oblong, or ovate, corolla, tubular at base, and
 a superior five-lobed berry. They are closely
 connected to the *Trichomanes* or *Trichomanes* from
 which they differ principally in the situation of
 the berry, which in the *Trichomanes* is at the base
 of the style, and in the *Arbutus* below it. Both
 these genera at least the American species, prop-
 erty belong to the class Dicotyledonous and order Mon-
 ocladiales. The American natural order is Monocla-
 diales. The European natural order is Dicotyledon-
 ales. The species *Arbutus* is known from the
 berry is known from the fact of its prominent
 base and from the fact that it is a shrub, growing
 among the rocks from the principal stems, and
 bearing upward with the young shoots only. The
 corolla is tubular and necked off from the old
 stem. A large scarious, scarious, white at base,
 attached by short pedicels, scarious, scarious,
 glabrous, shining above, pale beneath, entire, the
 margin rounded, but scarcely reflexed, and in the
 young ones pubescent. Flowers in a short cluster
 on the ends of the branches. Petioles reflexed
 flattened at base with short acute bracts under
 each and two minute ones at the sides. Calyx
 of five rounded segments, of a reddish colour, and

The family of plants bearing the name of *Arbutus* have for their distinctive marks a *five-part-ed calyx*, an *ovate corolla*, *pellucid at base*; and a *superior, five-celled berry*. They are closely connected to the *Vaccinia* or whortleberries, from which they differ principally in the situation of the berry, which in the *Arbutus* grows above the calyx, and in the *Vaccinium* below it.—Both these genera, at least the American species, properly belong to the class *Decandria* and order *Mono-gynia*. The Linnæan natural order is *Bicornes*. Jussieu has them among his *Ericæ*.

The species *Uva ursi*, Bear's grape or Bear-berry is known from the rest by its procumbent stem and entire leaves.—It trails upon the ground, putting out roots from the principal stems, and tending upward with the young shoots only. The cuticle is deciduous, and peels off from the old stems. Leaves scattered, obovate, acute at base, attached by short petioles, coriaceous, evergreen, glabrous, shining above, paler beneath, entire, the margin rounded, but scarcely reflexed, and in the young ones pubescent. Flowers in a short cluster on the ends of the branches. Peduncles reflexed, furnished at base with a short acute bracte underneath, and two minute ones at the sides. Calyx of five roundish segments, of a reddish colour and

persistent. Corolla ovate or urceolate, white with a reddish tinge, transparent at base, contracted at the mouth, hairy inside, with five short, reflexed segments. Stamens inserted at the base of the corolla with hairy filaments, and anthers with two horns and two pores in each. Germ round, style straight, longer than the stamens, stigma simple. Nectary a black indented ring, situated below the germ, and remaining till the fruit is ripe. Berries globular, depressed, of a deep red, approaching scarlet, containing an insipid, mealy pulp, and about five seeds, which in the American plant cohere strongly together, so as to appear like the nucleus of a drupe.

The leaves and stems of the *Uva ursi* are used in Sweden and Russia for the purpose of tanning leather. According to Linnæus, large quantities are annually collected for this use.

When chewed in the mouth, the leaves have an astringent taste, combined with some degree of bitterness. The result of such chemical trials as I have made with them, shews that they abound in tannin, which is probably their chief active constituent. A solution of gelatin occasions a copious precipitate; sulphate of iron an equally copious one of a black colour. Nitrate of mercury and lime water gave large precipitates from the

decoction, the first of a light green, the last of a brownish colour. Of the existence of gallic acid, at least as it exists in galls, I have found no sufficient proof. The decoction does not redden vegetable blues, and the black precipitate with the sulphate of iron soon subsides, leaving the fluid nearly colourless. The quantity of resin, mucous matter and extractive, provided they exist in this plant, must be minute ; since the decoction was not rendered turbid by the addition of alcohol or ether, nor the tincture by the addition of water, although after standing twenty four hours, some slight floculi appeared. Muriate of tin produced no precipitation from the decoction, though it gave one from the tincture. Acetite of lead and nitrate of silver gave large precipitates. Water distilled from this plant, suffered no change with sulphate of iron, or muriate of tin.

Professor Murray of Gottingen, finding a greater amount of soluble matter taken up by water than by alcohol, considers the former as the best menstruum for this article. A similar inference from the American plant was made by Dr. John S. Mitchell in an inaugural dissertation, published at Philadelphia in 1803. For medical uses, Murray prefers the decoction to the infusion.

The *Uva ursi* was probably known to the ancients, as it grows in all the southern parts of Europe. Clusius thinks it was the *αρκτου σταφυλη* of Galen, celebrated by him as a remedy in hemoptysis, and described as follows. “*Uva ursi in Ponto nascitur, planta humilis et fruticosa, folio Memæcyli, fructum ferens rubrum, rotundum, gustu austerum.*” But it is well known that the brief and imperfect descriptions of the ancients were productive of little else than uncertainty in Botany.

In modern times the *Uva ursi* was brought into notice about the middle of the eighteenth century by De Haen, as an efficient remedy in nephritic and even in calculous cases. It had been previously in use for these complaints in Spain, at Naples and Montpellier, and as a general astringent, at a still earlier period. Its reputation was still further augmented by subsequent dissertations, published upon its properties, and different sets of experiments were instituted to ascertain if it were not actually capable of dissolving the stone of the bladder. The results most in favour of its solvent power were those of Girardi, who diminished the weight and consistency of urinary calculi, by digesting them in a preparation of this plant. It appears however that the prep-

aration, which he employed, was an acid liquor, obtained by a destructive distillation of the leaves, and probably not superior to other weak acids in its solvent powers. On the other hand, Professor Murray found what might reasonably be expected, that these calculi were not materially affected by long digestion in a decoction of this plant at various temperatures.

The attention of many medical writers has been called to the properties of this medicine, and their reports as to its success are extremely various. Among its greatest friends, are De Haen, Professor Murray, and Dr. Ferriar; while of those whose opinion is more unfavourable, are Sauvages, Haller, Donald, Munro and Fothergill. Dr. Cullen adopts the opinion of De Heucher, that the symptoms of calculus generally are susceptible of relief from astringents, and believes that on this principle the *Uva ursi* is capable of mitigating complaints arising from that source.*

In this country the *Uva ursi* has acquired the good opinion of practitioners of medicine in re-

* In the preface to the third volume of *Medical Observations and Inquiries*, published at London, it is stated in very general terms, that the *Uva ursi* had been prescribed *unsuccessfully* by many of the members of the Society of Physicians in London. Dr. Woodville, in his *Medical Botany*, has unfortunately misquoted this passage, by reading "successfully" instead of "unsuccessfully."

peated instances. Professor Wistar of Philadelphia, as cited by Dr. Mitchell, has in several cases found *symptoms* like those of urinary calculus completely removed by this medicine. But these could not probably have been cases of real calculus. The late Professor Barton found the plant of much service in his own case of nephritic paroxysms, alternating with gout in the feet.

From the various testimonies which have been given respecting the properties of this article, we are not warranted in believing it to possess any real lithontriptic power. At the same time it undoubtedly proves a palliative for calculous symptoms in many cases.

I have repeatedly watched its effects in paroxysms of nephritis, brought on by gravelly concretions, and am on the whole inclined to believe in its tendency to allay sensibility in these cases, and to hasten the relief of the symptoms. It ought generally to be preceded by evacuations, and may be advantageously accompanied with opium.—In cases of dysury arising from a variety of causes, I have given the decoction of this plant with very satisfactory success in repeated instances.

The other diseases in which this plant has been recommended are, catarrhus vesicæ, leucorrhœa

and gonorrhæa. All these complaints it has doubtless cured, but is at the same time inferior to other medicines in use for the same purposes.

Some years ago the *Uva ursi* was recommended as a remedy in pulmonary consumption by Dr. Bourne of Oxford in England, and by other writers in the periodical works. It was stated to have a very sensible effect in diminishing hectic fever, and abating the frequency of the pulse dependent on it. We do not find however that subsequent experience has justified the expectations formed of it in this disease.

In Dr. Mitchell's experiments on the pulse with this medicine, it appears that the pulsations were sometimes, not always, slightly increased after taking it, but that in every case they soon sunk below the natural standard, and remained so for some time.

Of the powder of the leaves of *Uva ursi*, from one to two scruples may be given to most patients. Dr. Ferriar's dose in nephritis was from five to ten grains, but a larger quantity is more effectual, and is readily borne by the stomach. The decoction may be made from half an ounce of the leaves boiled for ten minutes in a pint of water. From a wine glass to a gill of this may be taken every hour.

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PLATE VI.

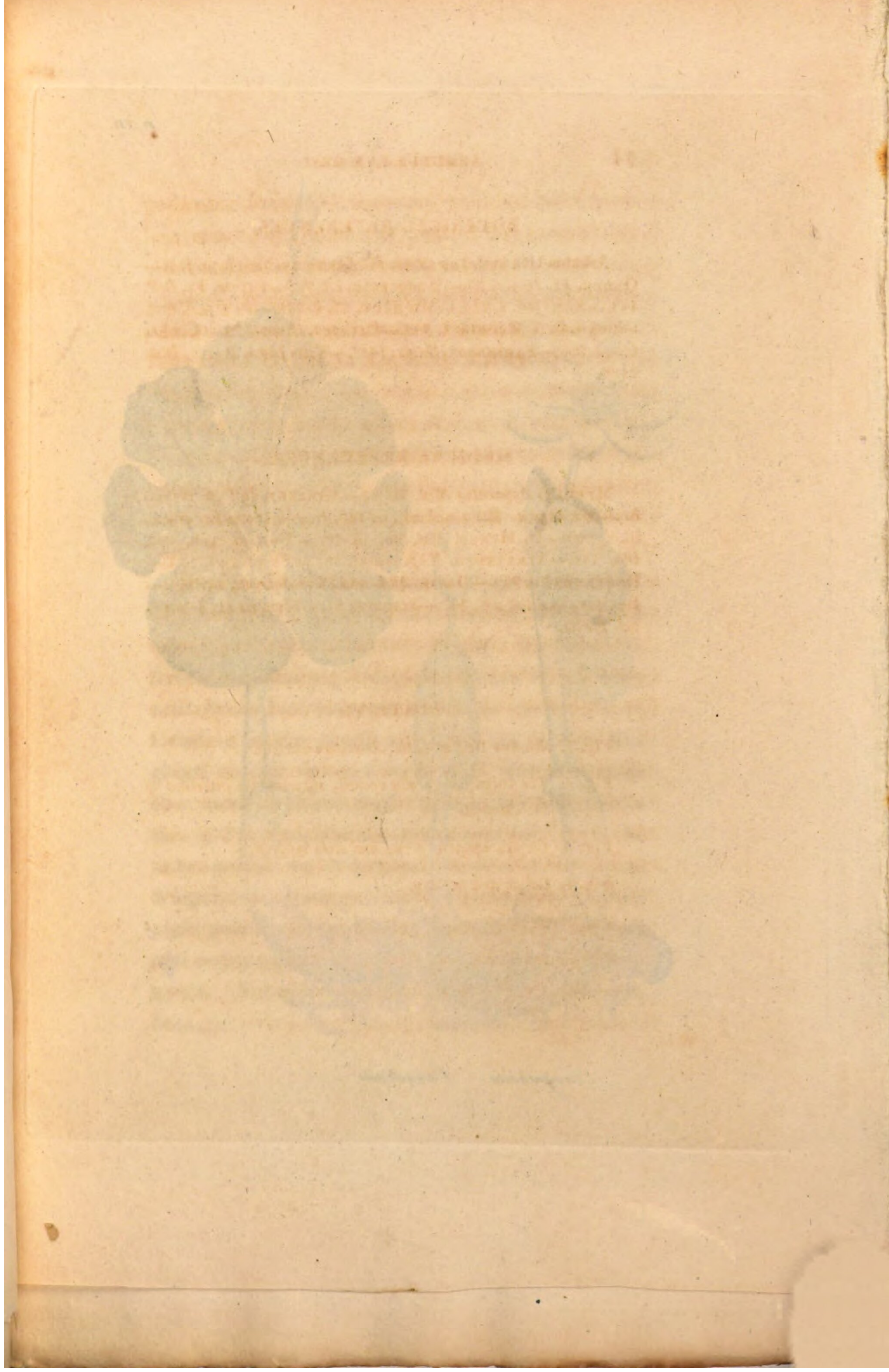
Fig. 1. *Arbutus Uva ursi*, the American variety.

Fig. 2. The magnified corolla opened, shewing the insertion of
the stamens.

Fig. 3. Calyx, nectary, germ, and style magnified.

Fig. 4. Calyx and nectary.

Fig. 5. Berry.





Sanguinaria Canadensis

SAFFORISARIA CANADENSIS.

Root root.

PLATE VII.

Safforisaria canadensis is a native of spring the botanist will find it in almost any part of the United States. It is a small plant with a single white flower growing from the base of a young, erect stem. It is common in the woods. In England it is called *Safforisaria* and in New England *Safforisaria*. The root is called *Safforisaria*. It has also the appellation of *Safforisaria*. *Safforisaria*, *Safforisaria*, *Safforisaria*. It is the only species we at present possess of the genus *Safforisaria*. It is distinguished by a two leaved calyx eight petals, and an oblong capsule, with one cell and many seeds. Class Polyandria, order Monogamia. Natural order Rhœadæa, L. Papaveracea, Willd.



Fig. II.

♂

W. B. Smith Sc.

Sagittaria Canadensis

SANGUINARIA CANADENSIS.

Blood root.

PLATE VII.

AMONG the earliest visitors of spring the botanist will find in almost any part of the United States the *Sanguinaria Canadensis*. Its fine white flowers proceeding from the bosom of a young, convoluted leaf, become visible in the woods, in Carolina, in the month of March, and in New England, toward the end of April. Its most common name is *Blood root*. It has also the appellation of *Puccoon*, *Turmeric*, *Red root*, &c. It is the only species we at present possess of the genus *Sanguinaria*, distinguished by a *two leaved calyx* *eight petals*, and an *oblong capsule*, with *one cell* and *many seeds*.—Class *Polyandria*, order *Mono-gynia*. Natural order *Rhœadææ*, L. *Papaveraceæ*, Juss.

The flower and leaf proceed from the end of a horizontal, fleshy, abrupt root, fed by numerous radicles. This root makes offsets from its sides, which separate as the old root decays, acquiring by this separation the abrupt or premorse form.

Externally the colour of the root is a brownish red. Internally it is pale, and when divided emits a bright orange coloured juice from numerous points of its surface. The bud or hybernaculum, which terminates the root, is composed of successive scales or sheaths, the last of which acquires a considerable size, as the plant springs up. By dissecting this hybernaculum in the summer or autumn, we may discover the embryo leaf and flower of the succeeding spring, and with a common magnifier, even the stamens may be counted.

The Sanguinaria is smooth throughout. The leaves grow on long channelled petioles. When spread out, they are reniform or heart shaped, with large roundish lobes separated by obtuse sinuses. The under side is strongly reticulated with veins; it is paler than the upper, and at length becomes glaucous. The scape is round, rises in front of the petiole, and is infolded by the young leaf. The calyx consists of two concave, ovate, obtuse leaves, which are perfect in the bud, but fall off when the corolla expands. Petals eight,

spreading, concave, obtuse, the alternate or external ones longer, so that the flower has a square appearance. This is its natural character, although cultivation sometimes increases the number of petals. Stamens numerous, with oblong yellow anthers. Germ oblong, compressed, style none, stigma thick, somewhat two lobed. Capsule oblong, acute at both extremities, two valved. Seeds numerous, roundish, compressed, dark shining red, half surrounded with a peculiar white vermiform appendage, which projects at the lower end.

After the flower has fallen, the leaves continue to grow, and by midsummer have acquired so large a size as to appear like a different plant.

The root of this vegetable is the only part which I have submitted to chemical examination. The experiments made on this substance, gave evidence of the following constituent principles.

1. A peculiar resin. Alcohol comes off from the root strongly impregnated with its colour and taste. This solution is rendered turbid by the addition of water. When evaporated to dryness, it leaves a residuum partially, but not wholly soluble in water. When successive quantities of water have been agitated with the powdered root until the infusion comes off colourless, alcohol acquires

a colour from the remainder. Æther receives from the root a yellowish colour, and when evaporated, leaves the resin nearly pure. In this state it is moderately adhesive, of a deep orange colour, bitter and acrid, diffusible, but not soluble in water. The resin may also be precipitated in small quantities from alcohol by water.

2. A bitter principle. Both water and alcohol acquire a strong bitter taste when digested on the root. From both these solutions a copious precipitate is thrown down by the nitrate of silver and the acetite of lead. Muriate of tin gradually renders the solution turbid, but without a precipitate. Oxymuriatic acid renders the alcoholic solution turbid, but produces no change in the watery solution for some time. At length a precipitate forms and slowly subsides; but produces no change in the watery solution. No precipitate was formed from the cold aqueous infusion in an hour by the sulphuric or nitric acids, by lime water, nitrate of mercury, muriate of barytes, oxalate of ammonia, sulphate of iron, gelatine or hydro-sulphuret of potash. After standing twenty four hours, a very slight precipitate was discovered from the lime water and nitrate of mercury only.

3. An acrid principle. The acrimony resides in part in the resin, but is also communicated to

water. It is diminished by heat, yet it does not come over with water in distillation.

4. *Fæcula*. The infusion of the root in cold water is limpid. The hot infusion is viscid and glutinous and stiffens linen. From this solution the *fæcula* is precipitated in a white powder by alcohol. Nitric acid dissolves this precipitate, which may be again thrown down by alcohol.

5. A fibrous or woody portion.

The beautiful colour of the root seems to reside more in the resin than in any other principle, since the alcoholic solution has always more than twice as much colour as the aqueous. Papers dipt in these solutions receive a bright salmon colour from the tincture, but a very faint one from the aqueous infusion. This circumstance furnishes an impediment to the use of this article in dyeing.

The medical properties of the *Sanguinaria* are those of an acrid narcotic. When taken in a large dose it irritates the fauces, leaving an impression in the throat for considerable time after it is swallowed. It occasions heartburn, nausea, faintness, and frequently vertigo and diminished vision. At length it vomits, but in this operation it is less certain than other emetics in common use. The above effects are produced by a dose of from eight to twenty grains of the fresh powdered root.

When given in smaller doses, such as produce nausea without vomiting, and repeated at frequent intervals, it lessens the frequency of the pulse in a manner somewhat analogous to the operation of *Digitalis*. This however is a secondary effect, since in its primary operation it seems to accelerate the circulation. Exhibited in this manner, it has been found useful in several diseases.

In still smaller doses, or such as do not excite nausea, it has acquired some reputation as a tonic stimulant.

Professor Smith of Hanover, New Hampshire, in a paper on this plant, published in the London Medical Transactions, vol. i. states that he found the powder to operate violently as an emetic, producing great prostration of strength, during its operation, which continued for some time. He had not known it to act as a cathartic. Snuffed up the nostrils, it proved sternutatory, and left a sensation of heat for some time. Applied to fungous flesh it proved escharotic, and several polypi of the soft kind were cured by it in his hands. He found it of great use in the incipient stages of pulmonary consumption, given in as large doses as the stomach would bear, and repeated. In cases of great irritation it was combined with opium. Some

other complaints were benefitted by it, such as acute rheumatism and jaundice.

Professor Ives of New Haven* considers the Blood root as a remedy of importance in many diseases, particularly of the lungs and liver. He observes, that in typhoid pneumonia, "in plethoric constitutions, when respiration is very difficult, the cheeks and hands become livid, the pulse full soft, vibrating and easily compressed,—the Blood root has done more to obviate the symptoms and remove the disease," than any remedy which he has used. In such cases, he observes, "the dose must be large in proportion to the violence of the disease, and often repeated, until it excites vomiting, or relieves the symptoms." He infuses from a scruple to half a drachm of the powdered root in half a gill of hot water, and gives one or two teaspoonfuls every half hour, in urgent cases, until the effect is produced. This treatment has often removed the symptoms in a few hours.

Dr. Ives thinks highly of its use in influenza, in phthisis, and particularly in whooping cough. He also states, that given in large doses, sufficient to produce full vomiting, it often removes the Croup, if administered in the first stages. It has been given, he remarks, "for many years in the

* Letter dated November 5, 1816.

country, some physicians relying wholly on this remedy for the cure of croup."

Dr. Macbride, of Charleston, S. C. who has contributed many judicious remarks on the medicinal properties of plants, to Mr. Elliott's excellent Botany of the Southern States; informs me,* that he has found the Blood root useful in Hydrothorax, given in doses of sixty drops, *ter de die*, and increased until nausea followed each dose. In a week or two the good effect was evident, the pulse being rendered slow and regular, and the respiration much improved. In the same letter he observes, "In torpor of the liver, attended with colic and yellowness of the skin, a disease common in this climate, I use the Puccoon with evident advantage. We use it also in jaundice, but in this disease I do not trust exclusively to it. I prefer the pill or powder (dose from two to five grains) and vinous infusion, to the spirituous tincture."

The tincture of Sanguinaria may be made by digesting an ounce of the powdered root in eight ounces of diluted alcohol. This preparation possesses all the bitterness, but less of the nauseating quality, than the infusion. In the dose of a small teaspoonful, it is used by many practitioners

* Letter dated December, 1816.

as a stimulating tonic, capable of increasing the appetite and promoting digestion.

BOTANICAL REFERENCES.

Sanguinaria Canadensis, LIN. *sp. pl.*—CURTIS, *Botan. Mag. t.* 162.—AITON, *Hort. Kew.* ii. 222.—WALTER, *Carol.* 153.—MICHAUX, *Flora* 1, 309.—PURSH, ii. 366.—*Sanguinaria minor*, DILLENIIUS, *Elth. f.* 326 and *S. major*, *f.* 325 in *t.* 252.—*Chelidonium maximum acaulon Canadense* RAIUS, *Hist.* 1887.—*Ranunculus Virg. albus*. PARKINSON, *Th.* 326.—*Chelidonium majus Canad. acaulon* CORNUTUS, *Canad.* 212.

MEDICAL REFERENCES.

SCHUEPF, 85.—SMITH, *Trans. Lond. Med. Society*, i. 179.—BART. *Coll.* 28.—CUTLER, *Mem. Amer. Acad.* i. 455.—THACHER, *Disp.* 331.

GERANIUM MACULATUM.

Common Cranesbill.

PLATE VIII.

IN common language the term *Geranium* includes all that extensive tribe of plants comprised by the old genus of that name, and principally characterised by their beaked fruit and five seeds which are scattered by means of awns. L'Heritier has divided this family into three distinct genera, under different orders in the artificial class *Monadelphia*. These are *Erodium*, having five stamens, five nectariferous scales and glands, and the awns of the fruit twisted and bearded. *Pelargonium*, which includes most of the Cape species so commonly cultivated among us, having about seven stamens, an irregular corolla, and a nectareous tube running down the peduncle. Lastly, *Geranium* having ten stamens, a regular corolla, five nec-

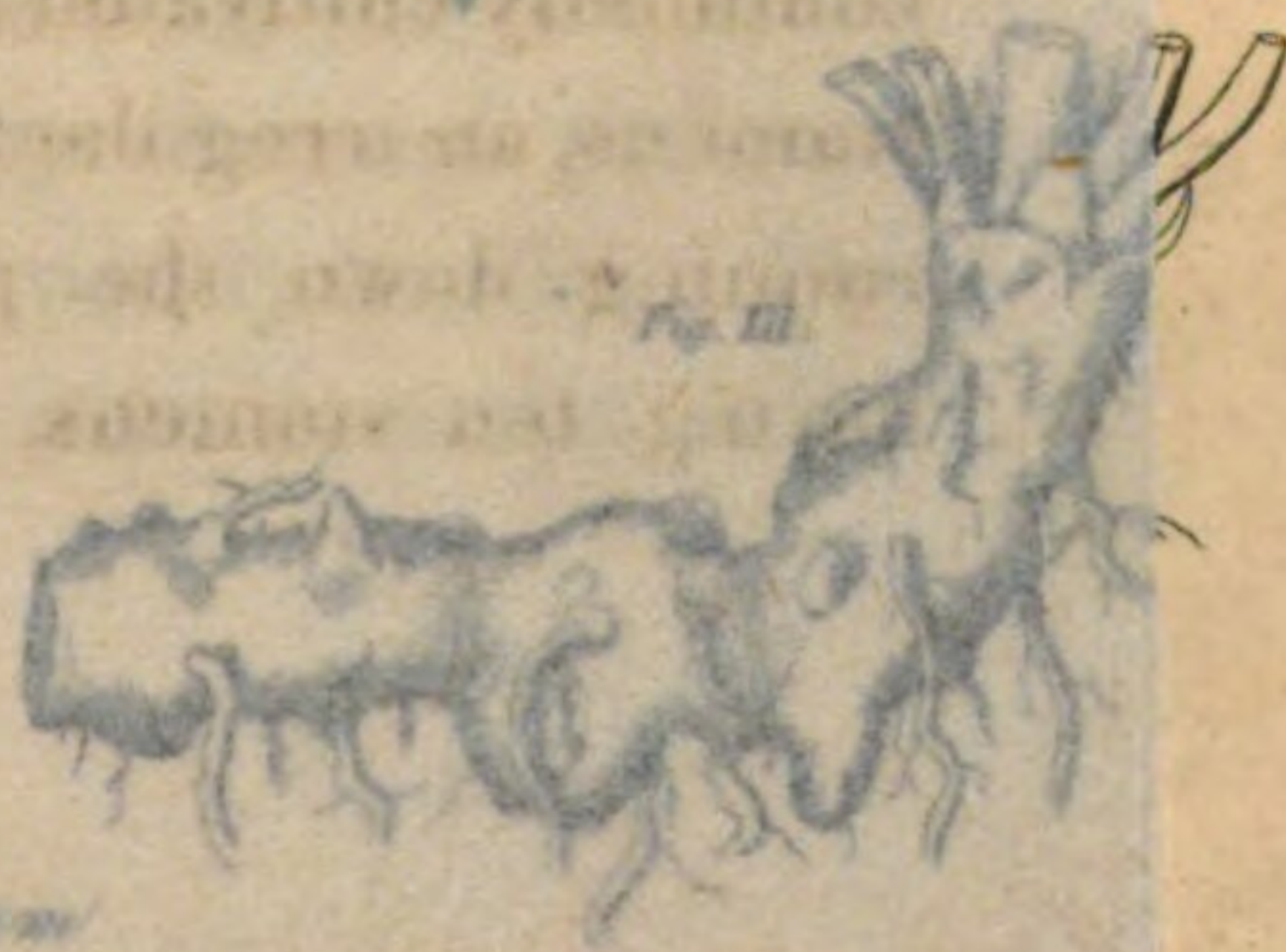


Fig. I.



Fig. IV

Fig. III.



Geranium maculatum

GERANIUM MACULATUM

Geranium maculatum

PLATE VII.

In common language the term *Geranium* includes all that extensive tribe of plants comprehended by the old genus of that name, and principally characterised by their beaked fruit and the seeds which are scattered by means of it. DeCandolle has divided this family into three distinct genera, under different orders in the method of *Monadelphic*. These are *Bradium*, having five stamens, five nectariferous scales and glands, the axes of the fruit twisted and bearded. *Felagium*, which includes most of the Cape species, commonly cultivated among us, having about eight stamens, an irregular corolla, and a nectaceous tube running down the peduncle. Lastly, *Geranium* having ten stamens, a regular corolla, the seeds



Fig. I.



Fig. II.



Fig. IV.

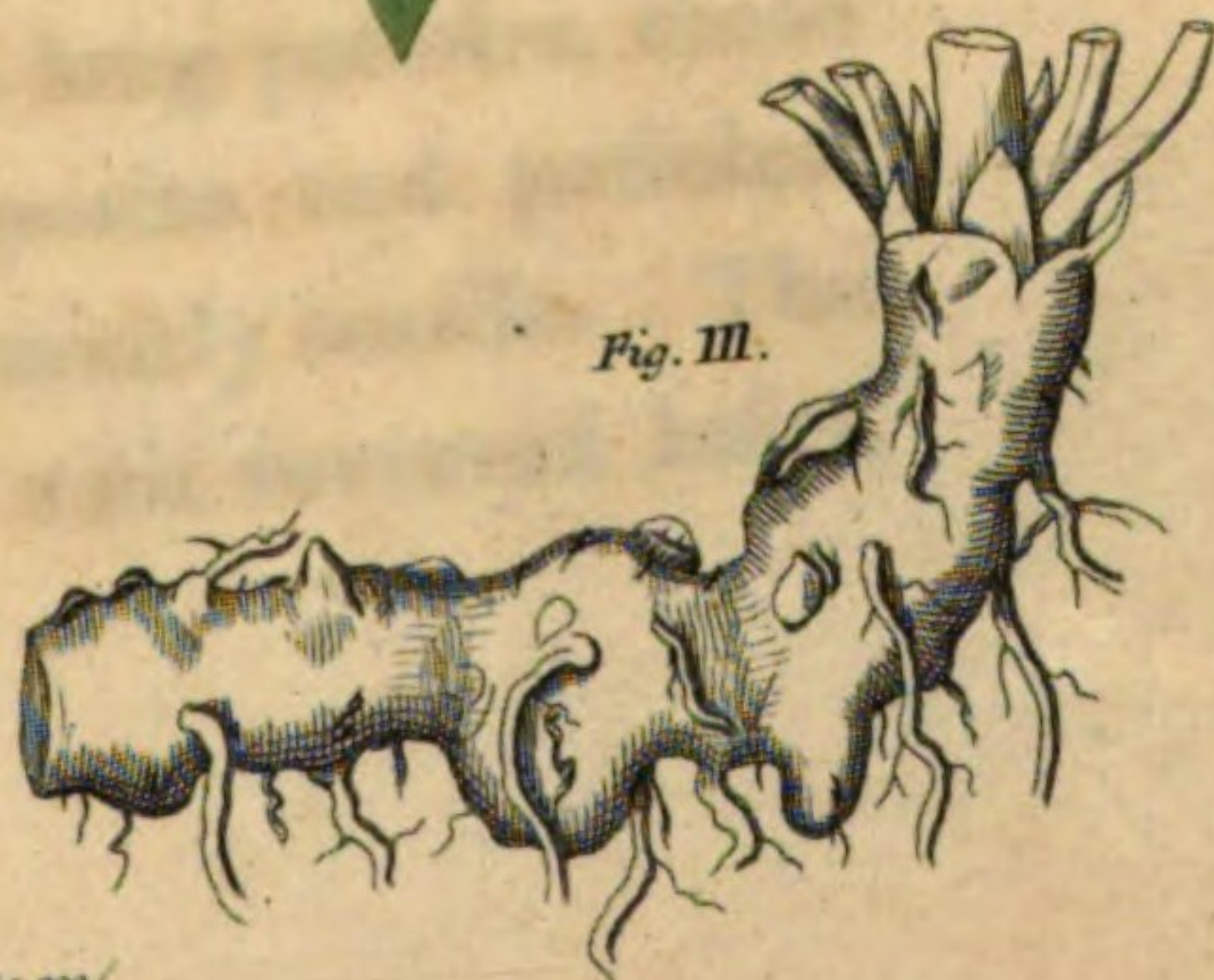


Fig. III.

Geranium maculatum

tariferous glands at the base of the longer filaments, the awns of the fruit neither bearded nor twisted. To this division belongs the plant under consideration, which has the following specific character. *Erect, hairy backward; stem forked; leaves opposite, three or five parted, cut; peduncles mostly two flowered; petals, obovate, entire.*

Jussieu has formed a natural order by the name of *Gerania*, which nearly corresponds to the *Gruinales* of Linnæus.

Although we have few species of *Geranium* in the United States, yet the present species, by its extensive diffusion, is a sufficient representative of the race. It is very common in low grounds, about Boston and Philadelphia, in the Carolinas, and in the western country upon the banks of the Ohio and Illinois.

The root of *Geranium maculatum* is perennial, horizontal, thick, rough and knobby. In most plants it sends up a stem and several root leaves. The leaves are spreading, hairy, divided in a palmate manner into three, five, or seven lobes, which are variously cut and toothed at their extremities; those of the root are on long petioles, those at the middle of the stem opposite and petioled, those at the top opposite and nearly sessile. The stem is erect, round, hispid with reversed hairs,

dichotomous, with a flower stalk in the fork. Stipules and bractes linear, dilated at base. Peduncles round, hairy, swelling at base, generally two flowered. Calyx of five oblong, ribbed, mucronated leaves, with the parts, which are outermost in the bud, hairy. Petals five, obovate, not emarginate, of a light purple colour, which is deeper when the plant grows in the shade, marked with green at the base. Stamens ten, erect or curving outward, the alternate ones a little longer, with nectariferous glands at the base; filaments dilated and united together at base; anthers oblong, deciduous, so that the number frequently appears less than ten. Germ ovate; style straight, as long as the stamens; stigmas five, at first erect, afterwards recurved. Capsule five seeded, surmounted by a long straight beak, from the sides of which when ripe are separated five thin, flat awns, which curl up, having cast off the seed contained in the cell at the base of each.

The root of the Geranium, which is the part to be used in medicine, is internally of a green colour, and when dry is exceedingly brittle and easily reduced to powder. It is one of the most powerful astringents we possess, and from its decided properties, as well as the ease of procuring it, it may well supersede in medicine many foreign ar-

ticles of its class which are consumed among us. The experiments, which I have made upon this root, have been principally directed to the examination of its astringent qualities.

A drachm of the powdered root was steeped in two ounces of cold water and the infusion filtrated. Successive portions of water were added until the liquid came off colourless and tasteless. The collected infusion had a pale greenish colour, and a styptic, austere taste. It did not redden vegetable blues.

To half this infusion was added a drachm of gelatin in solution. The liquor instantly became of a milky whiteness, and a copious white precipitate was thrown down. This precipitate was dried and assumed a semi-transparent, horny appearance. Its weight was eleven grains.

A drachm of kino treated in the same manner was rendered turbid, but gave a very scanty precipitate with the gelatin.

To portions of the same infusions was added a solution of the muriate of tin. In both of them a greenish precipitate was formed, but that of the Geranium was much the most immediate and abundant.

The sulphate of iron struck a dark purple colour with the infusion of Geranium. The com-

pound remained principally suspended at the end of twenty four hours, and when used in writing had the appearance of common ink, but in a few days changed to a dull brown colour. A portion of the fresh infusion was distilled, but the liquid which came over was not altered in colour by the sulphate of iron.

The above experiments indicate the presence of tannin and gallic acid, the former in large quantities, in the root of the Geranium. The proportion of tannin seems considerably to exceed that in the kino of the shops. The gallic acid is indicated by the dark precipitate remaining in solution. This is Berthollet's criterion. It differs however from the acid of oak galls in not reddening vegetable blues, and not passing over in distillation.

Alcohol and proof spirit readily dissolve the active constituents of the Geranium. The tincture has a great sensible astringency, and is a convenient mode of keeping the article for use.

The Geranium has been repeatedly employed in medicine by various practitioners in this country. I have found it useful in a number of cases, where astringents were capable of rendering service. It is particularly suited to the treatment of such discharges as continue from debility after the removal of their exciting causes. The tinc-

ture forms an excellent local application in sore throats and ulcerations of the mouth.

Its internal use has been recommended in dysentery and cholera infantum, but astringents are not always admissible in these complaints, at least in their early stages, during the existence of much active inflammation, or during the presence of any substance requiring to be removed.

The Geranium may be used in powder in extract, or in tincture. Its doses are similar to those of kino and catechu, a drachm or two of the tincture, twenty or thirty grains of the powder, and a quantity somewhat less of the extract.

BOTANICAL REFERENCES.

Geranium maculatum, *Sp. pl.* WILLDENOW, iii. 705.—GRONOVIVUS, *Virg.* 101.—WALTER, *Carol.* 175.—MICHAUX, ii. 38.—PURSH, ii. 448.—*G. caule erecto, herbaceo, foliis oppositis, quinque partitis, incisitis &c.* CAVANILLES, *diss. t.* 86, *f.* 2.—*G. batrachoides, Americanum, maculatum, floribus obsolete cœruleis.* DILL. *Elth.* 158. *t.* 131, *f.* 159.

MEDICAL REFERENCES.

SCHÆPF, 107.—BART. *Coll.* 7.—CUTLER, *Mem. Amer. Acad.* i. 469.—THACHER, *Disp.* 224.

PLATE VIII.

Fig. 1. *Geranium maculatum.*

Fig. 2. *The fruit.*

Fig. 3. *The root.*

TRIOSTEUM PERFOLIATUM.

Fever root.

PLATE IX.

THIS is rather a solitary plant, and though met with in most parts of the United States, it rarely, I believe, occurs in large quantities. About Boston it is found in several places at the borders of woods in rich, shady situations. Its common names are *Fever root* and *Wild ipecac*.* Pursh observes, that it is rare, and generally occurs in limestone soils. With us it flowers in June and ripens its fruit in September.

The genus *Triosteum* is found in the class

* The quaint appellation of Dr. *Tinker's weed*, which has been bestowed on this plant, is thus gravely commented on by Poiret. "Ses racines et celles de l'espece précédente passent pour émétiques ; le docteur Tinkar est le premier qui les a mises en usage, et qui a fait donner à cette plante par plusieurs habitans de l'Amerique septentrionale le nom d' *herbe sauvage du docteur Tinkar*."



Fig. II.



Fig. III.



Fig. IV.



Fig. V.



Fig. VI.



Fig. VII.

Fraxinum pycnanthum

TRISTRUM PERSICATUM

This is a very common plant, and though not very common in the United States, it is rarely a weed, but is often a pest. In Boston it is found in great numbers in the fields of waste in the city, and in the country. The common name is *Tristrum Persicatum*. French observers, this is a name, and generally names in the country. With us it is known as *Tristrum Persicatum*.

The genus *Tristrum* is found in the class

* The great reputation of Dr. Tinkar's work, which has been bestowed on this plant, is that given by the French. "Ses racines et celles de l'espèce précédente peuvent pour quelques; le docteur Tinkar est le premier qui les a mises en usage, qui a fait donner à cette plante par plusieurs habitants de l'Amérique septentrionale le nom d'herbe sauvage du docteur Tinkar."



Fig. 1.



Fig. II.



Fig. III.



Fig. IV.



Fig. V.



Fig. VI.



Fig. VII.

Triostema perfoliatum

Penstemon and under *Phlox*. Its natural habitat is among the strata of limestone and the *Phlox* of the limestone. It is characterized by a monopetalous, five-lobed, tubular corolla, with a long, slender, and three-lobed calyx. The species is distinguished from the rest of the genus by its flowers sessile and whorled. The root of this plant is perennial and sends out numerous horizontal branches. The stem is erect, hairy, and branched from the base. The leaves are opposite, the lower ones being often broader, ovate, acuminate, entire, rather flat, slightly serrated at the base, and a sort of weak, revolute, or folded margin. The portion which is visible above the ground is expressed in a folio-lanceolate, angustate, and acute form. It is narrower when the plant is in flower, as represented in the figure, and wider when it is in fruit. The flowers are axillary, sessile, five or six in a whorl, the upper ones generally in a single row. Each is furnished with two or three linear bracts. The calyx consists of five segments which are spreading oblong-linear colored, unequal persistent. Corolla tubular, consisting of a dull brownish purple covered with minute hairs, its base gibbous, its border open and

Pentandria and order *Monogynia*. Its natural affinities place it among the *Aggregatæ* of Linnaeus and the *Caprifolia* of Jussieu. It is characterized by a *monopetalous, five-lobed, unequal corolla*; a *calyx as long as the corolla*; and a *berry with three cells and three seeds*. The species *perfoliatum* differs from the rest in having its *leaves connate, and its flowers sessile and whorled*.

The root of this plant is perennial and subdivided into numerous horizontal branches. The stem is erect, hairy, fistulous, round, from one to four feet high. The leaves are opposite, the pairs crossing each other, connate, ovate, acuminate, entire, rather flat, abruptly contracted at base into a sort of neck, resembling a winged petiole. This portion varies in width, as Michaux has expressed it, "*foliis latius, angustiusve connatis.*" In general it is narrow when the plant is in flower, as represented in the figure; and wider when it is in fruit. The flowers are axillary, sessile, five or six in a whorl, the upper ones generally in a single pair. Each axil is furnished with two or three linear bractes. The calyx consists of five segments which are spreading, oblong-linear coloured, unequal, persistent. Corolla tubular, curving, of a dull brownish purple, covered with minute hairs, its base gibbous, its border open and

divided into five rounded, unequal lobes. Stamens inserted in the tube of the corolla, hairy, with oblong anthers. Germ inferior, roundish; style longer than the corolla; stigma peltate. The fruit is an oval berry of a deep orange yellow,* hairy, somewhat three sided, crowned with the calyx, containing three cells and three hard, bony, furrowed seeds, from which the name of the genus is taken.

This plant was made the subject of an interesting communication to the Linnæan society of New England, by Dr. John Randall. The experiments made by him on its medical uses and pharmaceutical preparations were numerous, and serve to throw much light on its properties. In trying the solvent powers of water and alcohol, he found that water afforded a much greater quantity of extract than alcohol, and that the spirituous extract was perfectly soluble in water, whence he infers that no resin in a pure state exists in the plant. He discovered no volatile oil by distillation, nor any other principle of activity in water distilled from the plant. He concludes also, that

* Pursh observes that the flowers and berries are *purple*. In all the specimens I have examined, which have not been few in number, the fruit was of a bright orange colour. If Pursh has seen a plant with purple berries, it is probably a different species from the true plant of Linnæus and Dillenius, which had "*fructus lutescentes*."

no free acid exists in this vegetable. Of the different parts submitted to examination, the leaves yielded the greatest quantity of soluble matter, but the root afforded that of the greatest activity. By decoction and evaporation with water an ounce of the dried stalks afforded one drachm of extract; an ounce of the dry roots, two drachms and two scruples, and the same quantity of leaves half an ounce. From a similar treatment of equal portions with alcohol, rather more than half the above quantities of extract were obtained.

The sensible qualities of the root were found essentially different from those of the herb. Both of them possess a large share of bitterness, but the root has also a nauseous taste and smell, somewhat approaching to those of ipecacuanha. The medical properties of the *Triosteum* are those of an emetic and cathartic. In the above dissertation, about thirty cases are detailed, in which different preparations and quantities of the article were given to various persons with a view to their medicinal effects. The general inference to be made from them is, that the bark of the root acts with tolerable certainty as an evacuant upon the alimentary canal, both by emesis and catharsis. When given alone, either in powder or decoction, the instances of its failure were not many, and

when combined with calomel, its operation was attended with a certainty, hardly inferior to that of jalap. The aqueous and spirituous extract of the root were likewise efficacious, and nearly in an equal degree. Preparations made from different parts of the herb possessed much less activity, the decoction of the leaves operating only as a diaphoretic, and that of the stalk producing no effect.

The late Professor Barton of Philadelphia, in his Collections toward a Materia Medica of the United States, speaks of this plant as a mild and good cathartic, sometimes operating as a diuretic and in large doses as an emetic.

My own experience with this plant has not been extensive, yet sufficient to satisfy me of its medicinal power. Where I have administered it, it has generally proved cathartic, a larger dose however being requisite for this purpose, than of jalap or aloes. It has sometimes failed to produce any effect, and I am inclined to believe that its efficacy is much impaired by age. Those who may incline to employ it, will do well to renew their stock annually, and to keep the powder in close stopped phials.

A dose of the bark of the root in powder is twenty or twenty five grains, and of the extract, a somewhat smaller quantity.

BOTANICAL REFERENCES.

Triosteum perfoliatum, LIN. *sp. pl.* AITON, *Hort. Kew*, i. 234.
 —PURSH. i. 162.—*Triosteum majus*, MICHAUX, *Fl.* i. 107.—*T.*
floribus verticillatis, sessilibus, GRONOV. 31.—*Triosteosper-*
mum latiore folio, flore rutilo, DILLENIIUS, *Elth. t.* 293. *f.* 378.

MEDICAL REFERENCES.

SCHÖEPF, 23.—BART. *Coll.* 29.

PLATE IX.

Fig. 1. *Triosteum perfoliatum*.

Fig. 2. *A flower separated.*

Fig. 3. *The corolla opened, shewing the stamens and style.*

Fig. 4. *The calyx.*

Fig. 5. *The fruit, crowned with the calyx.*

Fig. 6. *The same dissected to shew the three seeds.*

Fig. 7. *A seed.*

RHUS VERNIX.

Poison Sumach or Dogwood.

=

PLATE X.

THE fine, smooth foliage of the *Rhus vernix* render it one of the most elegant of our native shrubs, while its well known poisonous qualities make it an object of aversion, and deter most persons from a near inspection of its structure and characteristics. From Canada to Carolina it is a common tenant of swamps and meadows, usually attaining the height of ten or fifteen feet, but sometimes rising into a tree of twice that altitude. The names of *Poison tree*, *Poison wood*, *Poison ash*, &c. are applied to it in different parts of the United States. In Massachusetts it is universally known by the name of *Dogwood*. This appellation, being applied throughout the country to *Cornus florida*, serves to shew the fallacy of de-

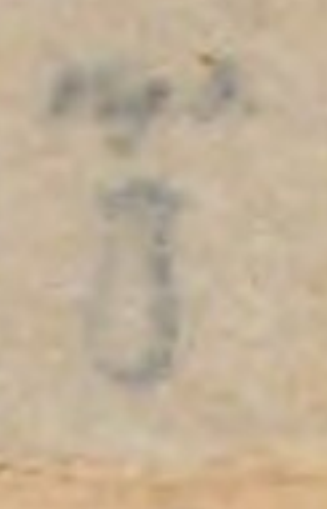
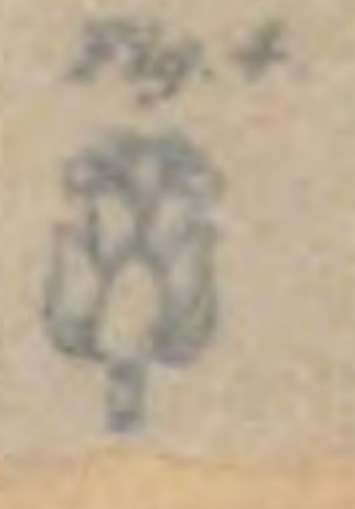
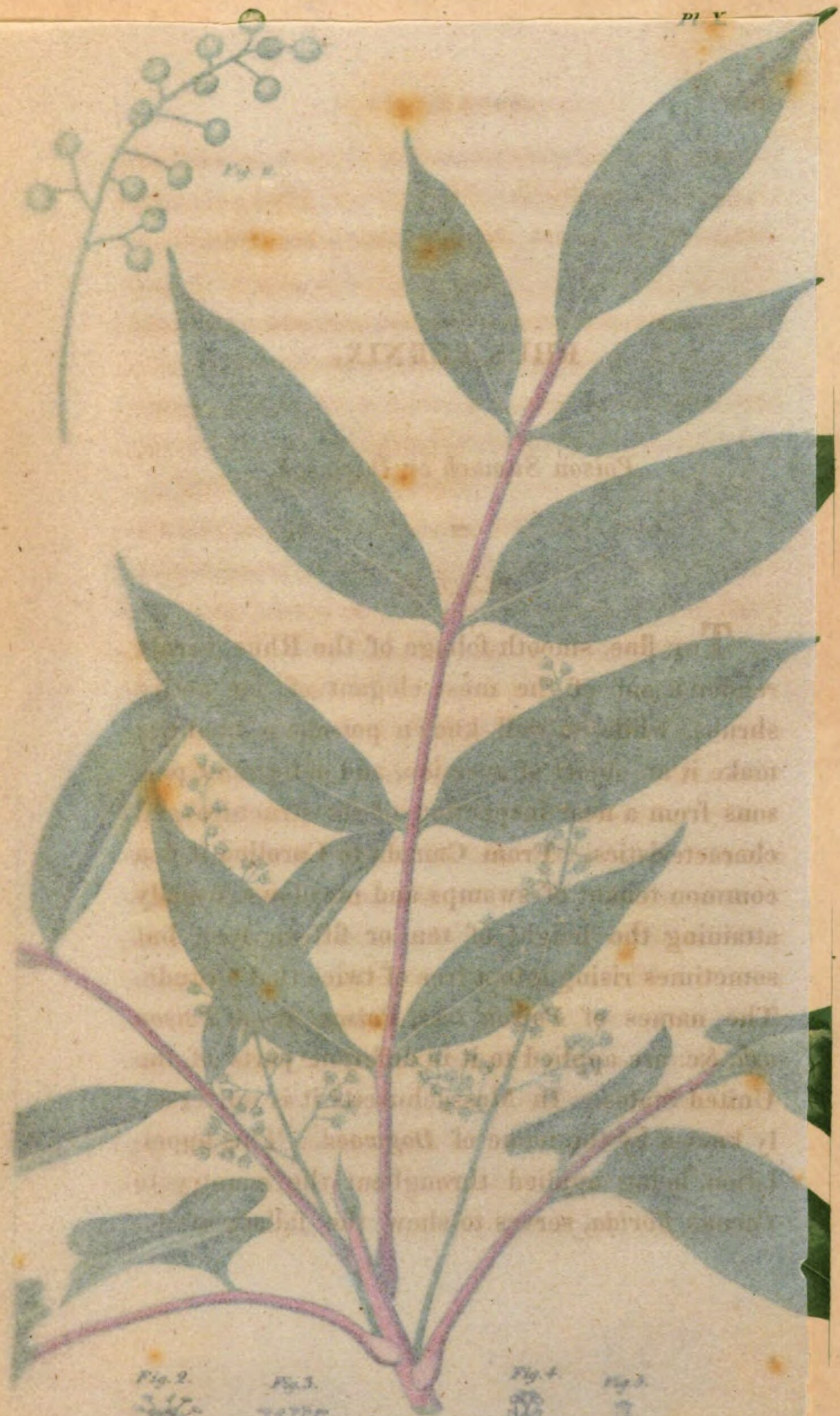


Fig. 1.
Alnus incana

RHUS VERNIX.

From Contact or Ingestion.

PLATE I.

THE fine, smooth foliage of the *Rhus vernix* renders it one of the most elegant of our native shrubs, while its well known poisonous qualities make it an object of aversion, and deter most persons from a near inspection of its structure and characteristics. From Canada to Carolina it is a common tenant of swamps and meadows, usually attaining the height of ten or fifteen feet, but sometimes rising into a tree of considerable altitude. The names of *Poison tree*, *Stagwood*, *Poison ash*, &c. are applied to it in different parts of the United States. In Massachusetts it is universally known by the name of *Dogwood*. This appellation, being applied throughout the country to *Cornus florida*, serves to shew the fallacy of de-



Fig. 6.

Fig. 2.

Fig. 3.

Fig. 1.

Fig. 4.

Fig. 5.

Rhus vernix

growing on either or prostrate stems for the
distinction of leaves. 2. mistake of very, infuse
the correspondence might exist between the leaves
stem of the upright stems of two trees so distant
from each other.

The stem of *Conyza* and other *Conyza* the
flowers of the *Conyza* and the *Conyza* the
flowers include the stems to which this plant
belongs. The flowers character consists in the
infuse of the stem and the leaves of the petals
and a base with one seed. The *Conyza* stem has
the flowers annual, white, tubular, its leaves ob-
long, entire, sessile, its pinnule large, and its
flowers tubular.

The stem of the *Conyza* stem is from one
to five inches in diameter, branching at top and
covered with a pale grey bark. The wood is
light and brittle and contains much pith. The
edge of the young stems and the petioles are usu-
ally of a fine red colour which sometimes much
in the bark of the stem. The leaves are pin-
nate, the petioles about a foot long, or some-
times slightly serrate, smooth, sessile, petio-
les about a foot long, except the terminal
one. The flowers which appear in June are very
small, green, in loose, sessile panicles. Where
the flowers are not in flower it is because the leaf an-

pending on vulgar or provincial names for the distinction of plants. A mistake of very injurious consequence might easily arise from the confusion of the English names of two trees so dissimilar in their qualities.

The class *Pentandria* and order *Trigynia*; the Linnæan order *Dumosæ* and the Jussieuean *Terebintaceæ* include the genus to which this shrub belongs. The generic character consists in *an inferior, five-parted calyx, a corolla of five petals, and a berry with one seed.* The *Rhus vernix* has its leaves *annual, pinnate, glabrous*; its leaflets *oblong, entire, acuminate*; its panicle *lax*, and its flowers *diœcious*.

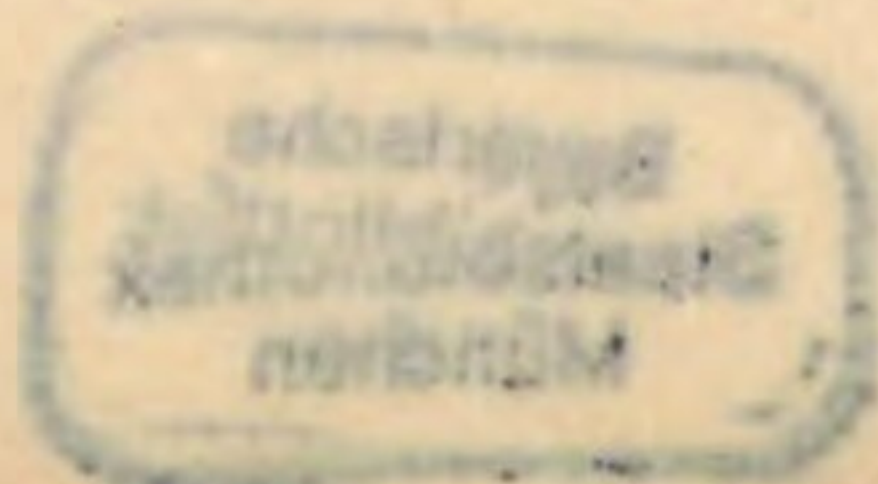
The trunk of the poison sumach is from one to five inches in diameter, branching at top, and covered with a pale greyish bark. The wood is light and brittle, and contains much pith. The ends of the young shoots and the petioles are usually of a fine red colour, which contributes much to the beauty of the shrub. The leaves are pinnate, the leaflets oblong or oval, entire, or sometimes slightly sinuate, acuminate, smooth, paler underneath, nearly sessile, except the terminal one. The flowers, which appear in June, are very small, green, in loose axillary panicles. Where they appear not axillary, it is because the leaf un-



der them has been detached. The barren and fertile flowers grow on different trees. The panicles of barren flowers are the largest and most branched. They are furnished with short, oblong bractes, and downy pedicels. The calyx has five ovate segments, and the corolla five oblong, sigmoid petals. The stamens are longer than the petals, and project through their interstices. The rudiment of a three-cleft style is found in the centre.—In the fertile flowers, the panicles of which are much smaller, the calyx and petals resemble the last, while the centre is occupied by an oval germ, ending in three circular stigmas. The fruit is a bunch of dry berries or rather drupes of a greenish white, sometimes marked with slight purple veins, and becoming wrinkled when old. They are roundish, a little broadest at the upper end, and compressed; containing one white, hard, furrowed seed.

A tree, supposed to be the same with the *Rhus vernix*, grows in Japan, and furnishes the celebrated black varnish of that country.

A controversy respecting the identity of the Japanese and American species, was carried on in the forty ninth and fiftieth volumes of the London Philosophical transactions, by Mr. Philip Miller



and Mr. John Ellis. The mass of evidence seems to justify the belief, that notwithstanding the remoteness of their situation, they are one and the same species. The description of the oriental tree, given in Kæmpfer's *Amœnitates exoticæ*, agrees very closely with that of the American species. [*Note G.*] Like our native *Rhus*, the Japanese tree possesses a poisonous influence, and frequently causes a severe cutaneous affection in those who approach or gather it. It only remains to shew, that a varnish may be obtained from the American *Rhus* vernix, to furnish strong presumptive evidence of the identity of the two.

If an incision be made in the bark of our *Rhus* vernix in the spring or autumn, a quantity of thick viscid fluid immediately exudes, and sometimes with such rapidity as to drop off before it can be collected. This juice has an opaque, whitish appearance, and a strong, penetrating, disagreeable smell. On exposure to the atmosphere, its colour soon changes to a deep black. It is extremely slow in drying, and permanently retains its black colour.

In the month of October, 1814, with the assistance of Dr. Pierson, whose case is afterwards described; I collected several ounces of this juice from a thicket of trees in Brighton. Being col-

lected in a phial, it retained its whitish colour, except at the surface, where it turned black from its contact with the air in the upper part. This juice was kept for more than two years without any change in its appearance. In cold weather it was extremely viscid, and flowed with difficulty.

Different portions of this juice were submitted to chemical examination. It was perfectly insoluble in water, although upon boiling with it, it formed a thick emulsion. Alcohol dissolved it sparingly, and the solution was rendered turbid by water. *Æther* combined with it more largely, forming a thick, opaque compound. Strong sulphuric acid combined with it, producing a black solid mass. Alkalies also combined with it, and a strong solution of pearl ash dissolved a portion of it, which was afterwards precipitated by sulphuric acid. It had an affinity for metallic oxyds, and powdered litharge, upon being boiled with it, rendered it nearly solid. In distillation at the heat of boiling water, nothing came over except a slight film upon the surface of the water. When the heat was raised to the boiling point of the juice, a quantity of thin, blackish, volatile oil came over, which dried up on being exposed to the air, leaving a slight coating on the surface of the vessel which contained it. The

portion remaining in the retort was much inspissated, and upon cooling became nearly solid.

Being desirous to try the effect of this juice, employed as a varnish, I applied a coating of it with a brush to different surfaces of wood, glass, tinned iron, paper, and cloth. These were exposed to the air and light during the whole of the months of July and August, at the expiration of which period they had not become dry. Each of the coatings was half fluid and adhesive, and had collected much dust. Upon the cloth and paper the juice had spread extensively, giving them an oily appearance.

Concluding from this experiment that the juice could not be usefully employed in its crude state, I endeavoured to render it more *drying* by the addition of litharge. The compound, which resulted from boiling with this oxyd, became dry in a short time, but was not distinguished for any remarkable degree of lustre.

The third and last experiment proved more satisfactory. A quantity of the juice was boiled alone, until nearly all the volatile oil had escaped, and the remainder was reduced almost to the state of a resin. In this state it was applied while warm to several substances, which after cooling exhibited the most brilliant, glossy, jet black sur-

face. The coating appeared very durable and firm, and was not affected by moisture. It was elastic and perfectly opaque, and seemed calculated to answer the purposes of both paint and varnish.

The chemical constitution of the juice of the *Rhus vernix* seems, from the foregoing experiments, to be most analogous to that of the balsams, consisting chiefly of a resin and an essential oil. The oil dissipates slowly at low temperatures, approaching in this and some other respects to the character of a fixed oil. The resin, when procured in contact with the atmospheric air, is black, opaque, and solid, rendered very adhesive, and at length fluid by heat.

A very distressing, cutaneous disease, it is well known, ensues in many persons from the contact, and even from the effluvium of this shrub. The poisonous influence which produces this affection is common to several other trees and plants, such as the Poison vine or Poison ivy, (*Rhus radicans*,) the Cashew nut, (*Anacardium occidentale*,) and the Manchineel, (*Hippomane mancinella*,) Even the garden Rue, and common Oleander, are said to affect some persons in a similar manner.—The *Rhus vernix* is the most formidable of this tribe which is found among us,

and occasionally produces the most severe effects. It is however extremely various in its action, upon persons of different idiosyncrasies. Some cannot come within the atmosphere of the shrub, without suffering the most violent consequences. Others are but slightly affected by handling it, and some can even rub, chew, and swallow the leaves without the smallest inconvenience.

The most formidable cases in persons subject to this poison, usually commence within twenty four hours after the exposure. The interval is sometimes longer, but more frequently shorter. The symptoms are generally ushered in by a sense of itching and a tumefaction of the hands and face. The swelling gradually extends over various parts of the body, assuming an erysipela-tous appearance. The inflamed parts become more elevated, acquiring a livid redness, attended with a painful burning sensation. Small vesicles now appear upon the surface, which extend and run into each other. They contain a transparent fluid, which by degrees becomes yellow, and at length assumes a purulent appearance. A discharge takes place from these vesicles or pustules, giving rise to a yellowish incrustation, which afterwards becomes brown. In the mean time an insupportable sensation of itching and burning is

felt. The inflamed parts become excessively swollen, so that not unfrequently the eyes are closed, and the countenance assumes a shapeless and cadaverous appearance, which has been compared to that in malignant small pox. The disease is usually at its height from the fourth to the sixth day, after which the skin and incrustations begin to separate from the diseased parts, and the symptoms gradually subside. It is not common for any scars or permanent traces of the disease to remain. Notwithstanding the violent character which it sometimes assumes, I never knew an authenticated case of its terminating fatally. It is however capable of occasioning the most distressing symptoms. Kalm, in his travels in North America, mentions a person who, by the simple exhalation of the *Rhus vernix*, was swollen to such a degree, that "he was stiff as a log of wood, and could only be turned about in sheets." Dr. Thacher mentions a case, in which the head and body were swollen to a prodigious degree, so as to occasion the loss of sight for some time; and the patient recovered at the end of several weeks with the loss of his hair and nails.

Of the cases which have fallen under my notice, the following affords a fair instance of the operation of this poison, as it ordinarily effects

those who are constitutionally liable to it. On the 27th of October, 1814, Dr. A. L. Pierson, then a student of medicine, accompanied me to Brighton for the purpose of collecting the juice of the *Rhus vernix*, growing at that place. He had always supposed himself constitutionally exempt from liability to the poison. The day proved warm, and the effluvium from the incisions we had made in the trees was very powerful. We were engaged in the collection for upwards of an hour, during which he was less exposed than myself, being absent a part of the time. His own account of the symptoms which followed this exposure is as follows :

“I felt no unpleasant effects for six or seven hours after returning to Boston. About 8 o'clock P. M. I perceived the backs of my hands were swollen and puffy, but without pain or itching; my forehead and upper lip were soon in the same state. On the morning of the 28th the tumefaction had increased, and I discovered various other parts of my body to be infected. The backs of my hands and wrists, which were the most advanced, began to show small watery vesicles. No applications were made till the noon of this day. I then applied cloths dipped in lead water to one hand and wrist, and in a spirituous solution of the

the corrosive muriate of mercury to the other. From this and subsequent trials, I am induced to prefer the lead. The parts began to itch—the tumefaction increased—vesication began to take place on the swollen surface—small pustules formed and ran into each other, and at last some were formed as large as nutmegs. On the 29th, my eyes were nearly closed, in consequence of the swelling of my forehead, eyebrows and cheeks. The contents of the vesicles were perfectly limpid—inoculation from them to other parts had no effect—neither in this nor any subsequent stage. On the evening of the 30th, the inflammation appeared at its height. The burning sensation and itching were intolerable. I could scarcely discern any object. On the 31st, the pustules began to appear a little milky—and before night the inflammation was evidently on the decline. I this day applied an ointment, composed of Ung. Stramonii, 1 oz.—Subm. Hyd. c. Ammonia (white precipitate) 1 dr. mixed—with a very pleasant effect. It was now soothing, although before it had seemed to irritate, and produced pain when applied. November 1st, a very free desquamation began, first on my forehead, hands and wrists. And in just a fortnight I was enabled to leave my chamber, blessed with a new cuticle from the root

of the hair on my forehead to my breast, from the middle of my forearm to the tips of my fingers, and on the whole inside of my thighs. The constitutional effects of this thorough vesication were but slight. During the first five days, my pulses were increased from ten to twenty strokes in the minute. The time of duration of the inflammatory symptoms in this case accords pretty well with the account of Prof. Barton, who states, I think, the height of it to be on the fifth day. It is worth observing, that the operation of the poison seemed to have a considerable effect in relieving me from dispeptic symptoms, with which I had been previously troubled, and also benefitted a chronic inflammation of my eyes. I am still subject to an eruption of watery pustules between my fingers, which dry up, and the cuticle peels off." *Letter dated July, 1815.*

Many constitutions are but slightly, or not at all, affected by the poison of the *Rhus vernix*. This I find to be my own case. After the same exposure, which occasioned the case just detailed, I experienced no ill consequence, except a slight vesicular eruption on the backs of the hands and about the eyes, which disappeared in a short time, without farther inconvenience. The same slight affection I have felt upon several subsequent ex-

posures, particularly when making, from a recent specimen, the drawing which accompanies this account.

I apprehend that a majority of persons are not liable to the injurious effects of the poisonous sumacs. Among persons residing in the country, exposures must occur very frequently from the abundance of these shrubs, especially of the *Rhus radicans*, by roadsides and elsewhere. Very few however, in proportion to the number exposed, have personal experience of their deleterious effects. In those on the contrary, in whom a constitutional liability to the poison exists, the disease frequently returns several times during life, notwithstanding the utmost precaution in avoiding its causes. A gentleman residing in the country informed me, that he had been seven times poisoned to the most violent degree. In such constitutions a slight exposure is sufficient to excite the disease. I have known individuals badly poisoned in winter from the wood of the *Rhus vernix*, accidentally burnt on the fire. Others have made the same observation.

Some farther remarks on the poison of these shrubs, and on the treatment of the disease occasioned by them, will be made in a future part of this work, under the head of *Rhus radicans*.

Many interesting observations on the properties of these species of Sumach, will be found in an inaugural dissertation, by Dr. Thomas Horsfield of Bethlehem, Pa. a work of much industry and merit.

In the New York Medical Repository is an account of a swarm of bees, which, having alighted on the branches of the *Rhus vernix*, were the next day found dead, with their bodies black and swollen. This is a remarkable circumstance. There is certainly no instinctive aversion in these animals for the tree. In the flowering season the blossoms, which are very fragrant, are always thronged with a multitude of winged insects in quest of their honey.

The introduction of the juice into the arts will not perhaps take place among us, during the present high price of labour, and the general prejudice which exists against the shrub. In some future period, it is probable that a substance, which is found so valuable in the eastern countries, will not be neglected among us. It might safely be procured by persons not subject to the poison, and, with proper precautions, would injure no one during its preparation and use. A pound of the juice in a day might be collected by an individual. When thoroughly dry, it ceases to emit an

effluvium, and nothing farther is to be apprehended from its effects.

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PLATE X.

Fig. 1. *Rhus vernix*, with staminiferous flowers.

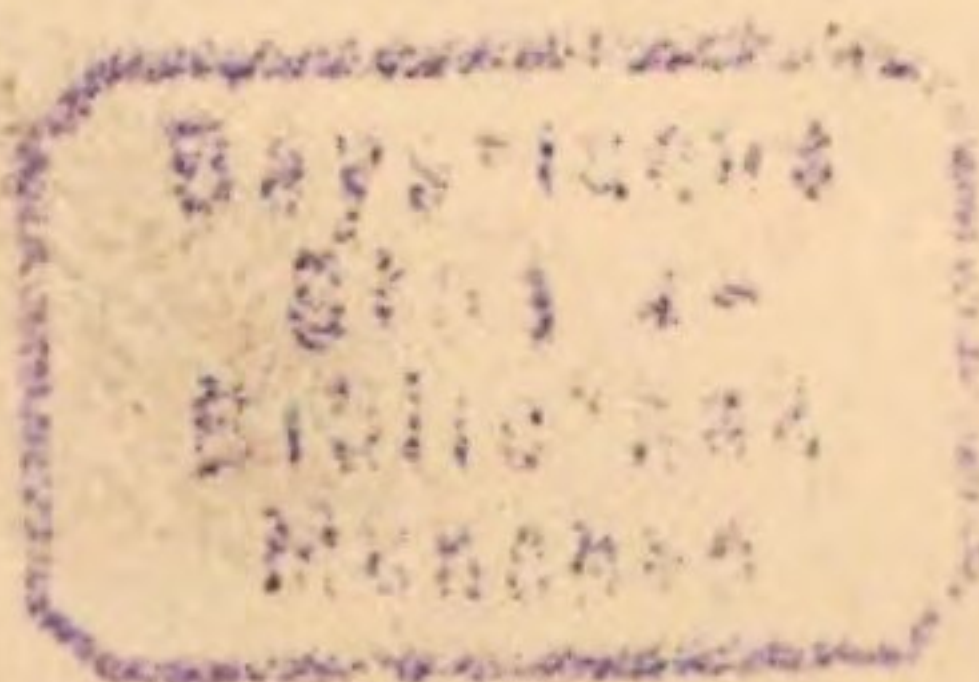
Fig. 2. A staminiferous or barren flower magnified.

Fig. 3. Stamens and rudiment of a pistil.

Fig. 4. A fertile flower magnified.

Fig. 5. Germ and stigmas.

Fig. 6. The fruit.



effluvia, and nothing further is to be apprehended from its effects.

BOTANICAL REFERENCES

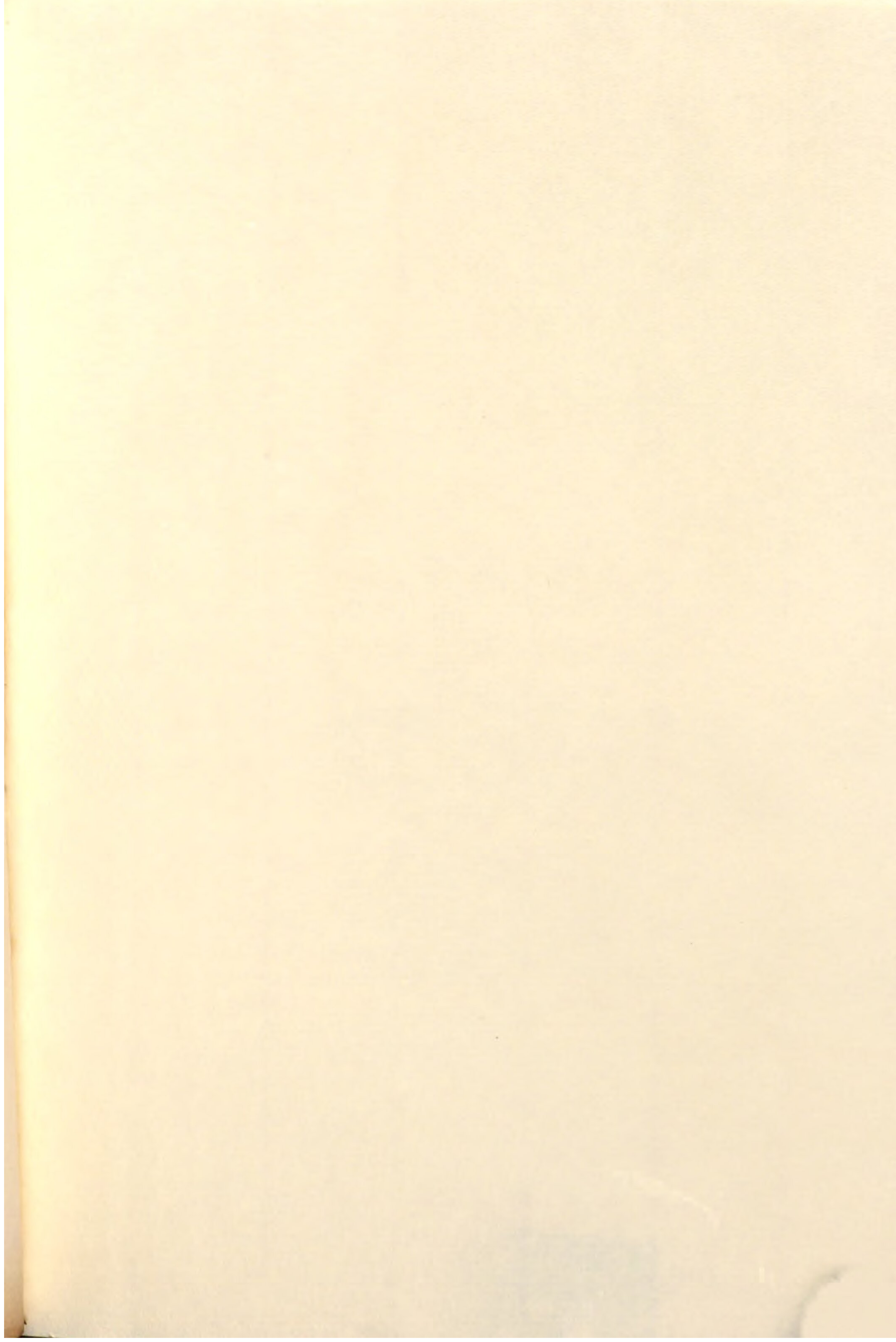
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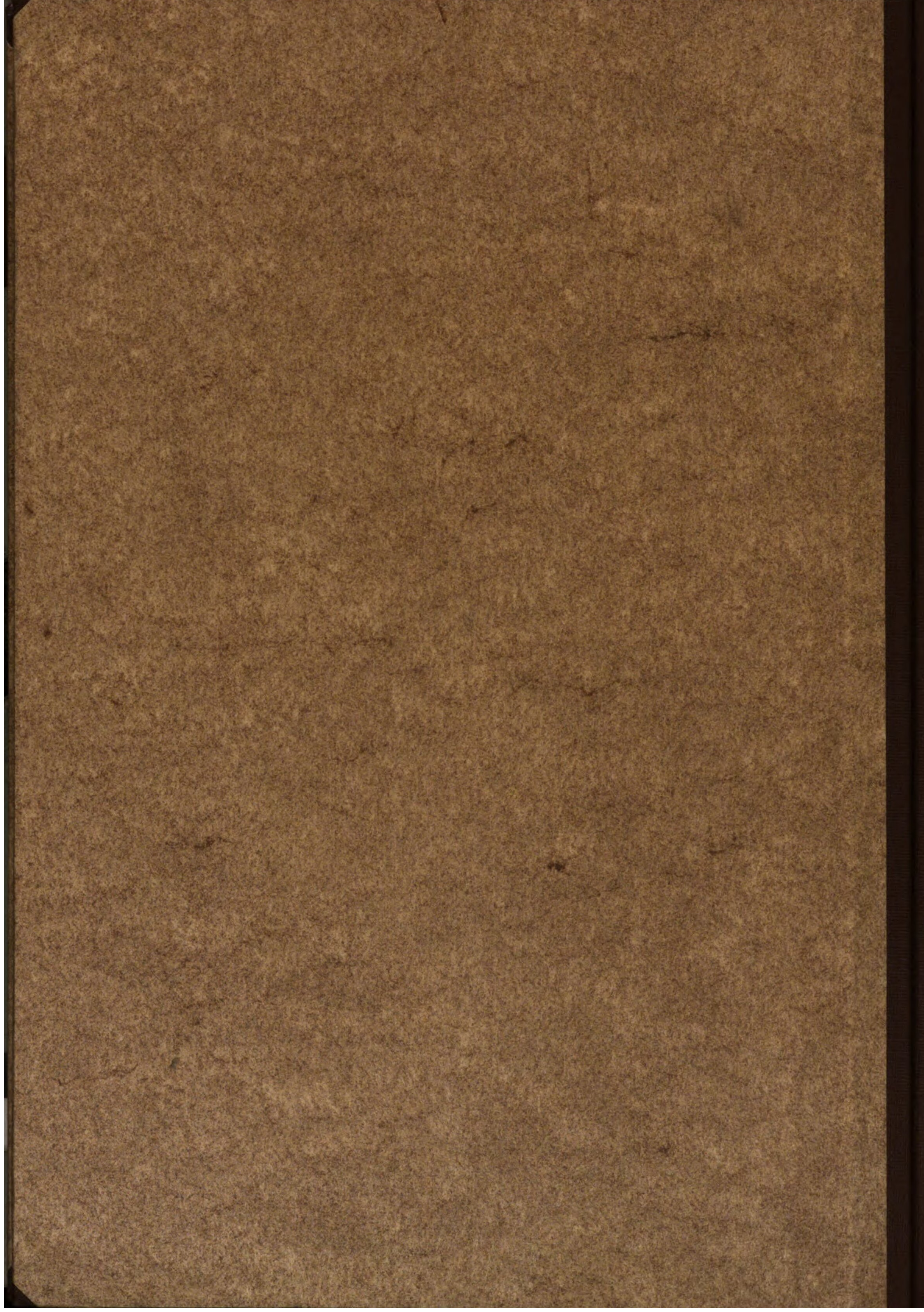
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PLATE X.

- Fig. 1. Rubus vermic. with stamens and pistil.
 Fig. 2. A stamens or pistil flower magnified.
 Fig. 3. Stamens and pistil of a fruit.
 Fig. 4. A pistil flower magnified.
 Fig. 5. Fruit and stem.
 Fig. 6. The fruit.





Bigelow, Jacob

American Medical Botany being a Collection of the Native medicinal Plants
of the United States, containing their Botanical History and Chemical
Analysis ...
Bd.: [1,1]

Boston (1817)

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